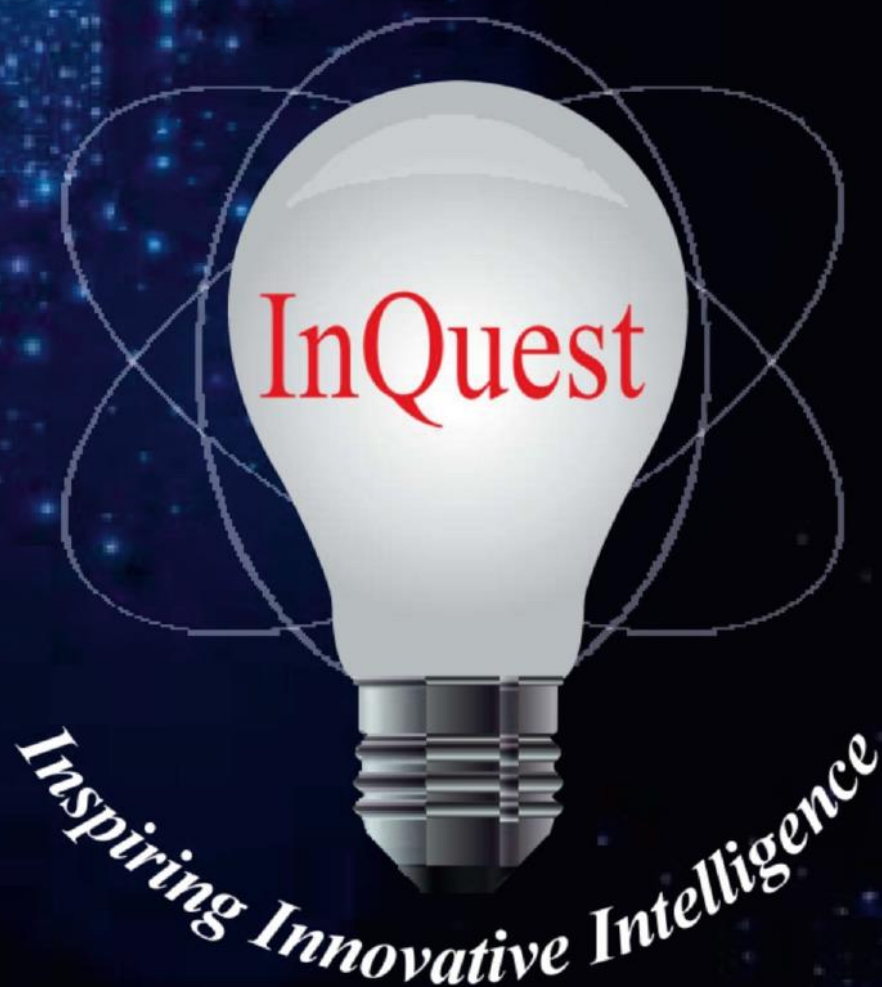




5th Edition
ISBN 978-81-929797-6-2

St. Xavier's College Jaipur



Xavier's Research Projects Committee

Session 2022-23

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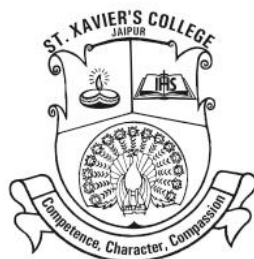
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St. Xavier's College Jaipur



Xavier's Research Projects Committee

Session 2022-23

FOREWORD

After a pandemic-imposed hiatus of two years, we are pleased to finally host the fifth edition of *InQuest “Inspiring Innovative Intelligence”*. This book, is a research endeavor by Xavier’s Research Projects Committee of St. Xavier’s College, Jaipur and has become a venue for novel research conversations among Undergraduate & Postgraduate students and research scholars. This book is a compilation of research works of scholars from different fields of knowledge.

The central focus of our theme this year, "Exploring the Influence of Socio-economic Policies on Global Development," aims to scrutinize our reactions to every dimension of global progress. This initiative is designed to unveil the substantial role played by socio-economic policies in advancing diverse sectors worldwide. Although researchers engage in diverse fields and investigate various subjects, they all embrace a common altruistic philosophy. Choosing to live with a dedication to enhancing the realm of knowledge through research is not merely an admirable objective; it can become a way of life.

The main objective of the research endeavor is to establish an inclusive platform for students to showcase their work. This publication features numerous papers that serve as outstanding instances of empirical research applied to pertinent policies, frameworks, and various socio-economic parameters. These contributions engage in a meaningful dialogue aimed at assessing global development. Research is pervasive in institutions of higher learning, and this book serves as a testament to the diverse initiatives undertaken by the college to foster research at the undergraduate level.

Engaging in research projects empowers students to enhance their proficiency in core subjects and delve into related topics with greater depth. The research papers featured in this book are not only contemporary but also thought-provoking. We welcome constructive comments and suggestions from our readers to further enhance the quality and usefulness of the book.

In conclusion, we anticipate that readers will effectively utilize this valuable research material and actively contribute their research findings for publication in subsequent editions of this book. Our ongoing efforts will persist in disseminating the research book among relevant communities and attracting other exceptional authors and readers to join this scholarly exchange.

XAVIER’S RESEARCH AND PROJECT COMMITTEE

MESSAGE

I am pleased to announce the recent launch of the fifth edition of InQuest, titled "Inspiring Innovative Intelligence." This research initiative is spearheaded by the Xavier's Research Projects Committee at St. Xavier's College, Jaipur, with a focus on the theme "The Impact of Socio-economic Policies on Global Development." Acknowledging the crucial role of research in the academic advancement of our institution, I take pride in being a member of the team committed to meeting the research-oriented requirements of students and nurturing an environment conducive to innovative learning.

In today's globalized educational landscape, the significance of research cannot be overstated. The Xavier's Research Projects Committee has been established with the goal of instilling a spirit of independent research among students. Our aim is ambitious: to systematically address relevant problems, explore creative solutions, and cultivate an educational atmosphere conducive to challenging research endeavors.

I am confident that this endeavor in the field of research will have a positive impact on the lives of our students, fostering the adaptability necessary for success in our ever-evolving global environment. The Committee has effectively involved young scholars in meaningful research activities across various projects, using college education as a platform to encourage out-of-the-box thinking.

This year's theme, "The Impact of Socio-economic Policies on Global Development," will delve into a multitude of issues, ranging from strategic and tactical considerations to existential questions. We emphasize inclusive and human-centric development, along with the re-balancing of the global order. Amidst the ongoing perfect storm, we recognize the imperative for a departure from our pre-pandemic 'normal,' characterized by inequality and exclusion.

Now is the time for a 'new world,' a time to engage in coherent discussions about what is substantive and sustainable, guiding us to make informed choices. Exposing students to creative thinking through pedagogical tools will undoubtedly enhance their knowledge, writing skills, and research abilities, preparing them for the future. I praise the faculty members for their unwavering efforts and extend my congratulations to the students for their innovative work. I wish everyone insightful and thought-provoking research endeavors that may pave the way for a more inclusive future.

Rev Fr Dr A Rex Angelo SJ
Principal



St. Xavier's College, Jaipur

Nevta - Mahapura Road, Jaipur-302029

Affiliated to the University of Rajasthan
Approved under Section 2(f) and 12(B) of UGC Act, 1956



2nd NATIONAL SYMPOSIUM 2023 ON

**“The Impact of Socio-economic Policies
on Global Development”**

13-14 March 2023



The Research and Project Committee (RPC)



in collaboration with



Innovation & Incubation Cell (IIC)/Innovation Council and Intellectual Property Rights Committee *is organizing*

Student Research Training Programme (S RTP)

under the aegis of Internal Quality Assurance Cell (IQAC)

Program Details:

- 7-Day Student Research Development Programme (SRDP) (Only for the Registered Participants scheduled from 27 February 2023 onwards)
- 2-Day Workshop on Research Methodology scheduled on 13-14 March, 2023
- 2nd National Symposium on “The Impact of Socio-economic Policies on Global Development” scheduled on 13-14 March, 2023
- Release of INQUEST (Students’ Research Publication) session 2021-22 with ISBN number scheduled on 14 March, 2023

Recognition:

- Best Presenter Award
- Best Paper Award
- Certificate of Participation: To the Attendees of Research Methodology Workshop and National Symposium Attendees
- Certificate of Presentation: To the paper presenters in the National Symposium
- Publication: The selected papers will be published in the Edited Volume of INQUEST (Students’ Research Publication) with ISBN number

Important Dates

Last Date of Registration and Payment: 25 February 2023

Last Date of Full Paper Submission: 6 March 2023

Last Date for Presentation Submission: 10 March 2023

(Mode of Submission: Only by email to researchproject@stxaviersjaipur.org)

Program Coordinators:

Research and Project Committee (RPC)

Innovation & Incubation Cell (IIC)/Innovation Council

Intellectual Property Rights Committee (IPR)

For any query:

Contact us at email id: researchproject@stxaviersjaipur.org

Registration Fee: Rs. 200/-
(For students/outside rs)
(Lunch and Kit)

Registration Link: <https://forms.gle/KEQcXv8TQ2paCu1Q7>



7-Day Research Student Development Programme (SRDP)

Only for the Registered Participants scheduled from 27 February 2023 onwards

Overview of Research

Basics of Research, Importance & Need of Research

Research Process

Steps of Writing the Research Paper & Outline of the Research Paper

Review of Literature and Referencing

Identifying Research Gap

Research Methodology

Data Collection Methods, Introduction to Primary and Secondary Research, Designing Questionnaires etc

Research Analysis

Basics of Analytical Tools

Findings and Conclusion

Data Interpretation, Conclusion and Scope of Future Work



CALL FOR PAPERS

Research and Project Committee invites research papers for the following sub-themes for presentation at the National Symposium.

- Sub-Themes:**
- Sustainable Ecology
 - Digitization and Digitalization
 - Contemporary issues in Management
 - Trade and Commerce
 - Education and Human Development
 - Energy and Environmental Protection
 - Health Disparities worldwide
 - Society & Culture
 - Socioeconomic Policies
 - Leadership and Politics

The sub-themes are merely suggestive and not exhaustive in nature and participants may go beyond the sub-themes for their research. Selected papers shall be published in the form of a book with an ISBN number.

GUIDELINES FOR THE PAPER

The following submission guidelines are to be adhered to:

- ✎ Abstract shall not exceed 500 words and shall be accompanied by 4-5 key words.
- ✎ All papers shall be submitted in English.
- ✎ Co-authorship is permitted, subject to a limit of 3 authors per submission.
- ✎ Cover page containing the Author's Name, University/Organization, Paper Title, Email Address and Mobile Number shall be attached with the submission email, and the said details shall also be mentioned in the body of the email.
- ✎ All contributions must represent original ideas and interpretations coupled with critical evaluation and assessment.
- ✎ Word Limit: 4000-6000 words (exclusive of footnotes)
- ✎ No part of the paper should have been published earlier or should be under consideration for publication. Any form of plagiarism shall result in immediate disqualification.
- ✎ Entries for the Symposium shall be emailed to **researchproject@stxaviersjaipur.org** under the subject title "Entry for National Symposium – [Name(s) of Author(s)]" in Microsoft Word (.doc or .docx) format.
- ✎ The file name shall contain the full name/s of the author/s.
- ✎ Any queries regarding the event shall be addressed to **researchproject@stxaviersjaipur.org**. Abstract and full paper is to be mailed as per the guidelines and formatting specification before last date of submission.

FORMATTING SPECIFICATIONS

The following formatting specifications are to be adhered to:

- ☞ Main body Font: Times New Roman, Size 12.
- ☞ Line spacing shall be 1.5 points for the main body, and 1 point for the footnotes.
- ☞ Alignment shall be Justified.
- ☞ One inch margin shall be maintained on all sides.
- ☞ Reference shall adhere to the following format for citation.
 - **Book:** Author, A.A.. (Year of Publication). The Title of work. Publisher City, State: Publisher.
 - **Magazine:** Author, A.A.. (Year, a month of Publication). Article title. Magazine Title, Volume(Issue), pp.-pp.
 - **Newspaper:** Author, A.A.. (Year, Month Date of Publication). Article title. Magazine Title, pp. xx-xx.
 - **Website:** Author, A.A.. (Year, Month Date of Publication). Article title. Retrieved from URL
 - **Journal:** Author Surname, F. M. (Publication Year). Article title: Subtitle. Journal Title, Volume(issue), page range. URL or DOI

DELEGATE PROFILES

- ☞ Undergraduate, Postgraduate Students and Scholars
- ☞ Individual Inventors, Industrial Professional and Entrepreneurs

A TWO-DAY INTERACTIVE WORKSHOP ON RESEARCH METHODOLOGY

The symposium will consist of a workshop cum special sessions by knowledgeable and eminent enthusiasts in the field of research. These special sessions shall revolve around major themes in the field of research.

SCHEDULE

Day 1: 13/03/2023	Session	Details
9.30 am - 10.00 am	Inaugural Session	
10.00 am -11.30 am	Research Methodology - Session 1	Application of Software in Research
12.00 am -01.30 pm	Paper Presentations	
Day 2: 14/03/2023	Session	Details
9.00 am - 10.30 am	Research Methodology - Session 2	Data Analysis Software using Excel
15 min break		
10.45 am -12.15 pm	Paper Presentations	
45 min break		
2.00 pm - 2.30 pm	Validation	

It is mandatory for all participants to attend all the sessions.

REGISTRATION AND PAYMENT

Registration Fee: Rs. 200/- (for students/outside rs)

Registration link: <https://forms.gle/KEQcXv8TQ2paCu1Q7>

For any query: Contact us at email id: researchproject@stxaviersjaipur.org

Scan To Pay



RECOGNITIONS

- **Best Presenter Award**
- **Best Paper Award**
- **Certificate of Participation:** To the Attendees of Research Methodology Workshop and National Symposium Attendees
- **Certificate of Presentation:** To the paper presenters in the National Symposium
- **Publication:** The selected papers will be published in the Edited Volume of INQUEST (Students' Research Publication) with ISBN number

ORGANIZING MEMBERS

PATRONS

- Fr Dr Arokya Swamy SJ, Manager
- Fr Dr A Rex Angelo SJ, Principal

CO-PATRON

- Fr Dr Raymond Cherubin SJ, Vice Principal
- Fr Dr M Amaldass SJ, Dean, Research & Development

CONVENOR

- Dr Vaishali Singh

CO-CONVENOR

- Mr Yashwardhan Singh
- Dr Nitasha Khatri

ORGANISING SECRETARY

- Dr Ankita Rathore

ORGANIZING COMMITTEE

- Dr Shikha Bakshi and Ms Poorvi Medatwal
(Innovation & Incubation Cell (IIC)/Innovation Council)
- Dr Madhu Sharma and Ms Anjali Pareek
(Intellectual Property Rights Committee)

ANNUAL REPORT' 23
XAVIER'S RESEARCH AND PUBLICATION CELL
(RESEARCH AND PROJECT COMMITTEE)

In its commitment to delivering high-quality education, the Jaipur Xavier Educational Association (JXEA) has established Xavier's Research and Publication Cell (XRPC) at St. Xavier's College, Jaipur. This initiative aims to foster excellence in research, innovation, as well as lateral, critical, and analytical thinking across various disciplines.

As the institution has garnered acclaim for its academic prowess, there has been a notable shift towards achieving excellence in research. To facilitate discussions on emerging research trends and promote multidisciplinary research, the college regularly organizes conferences as part of its research-focused activities.

At the college level, the Research and Projects Committee (RPC) has been instituted to encourage and support both undergraduate and postgraduate research among students. Projects involving field surveys undergo evaluation by external experts, with high-quality projects being published as chapters in the college's research book, INQUEST.

The Research and Project Committee (RPC) demonstrated significant activity in the academic year 2021-22. XRPC is dedicated to accelerating research for both faculty and students through publications, projects, and symposiums, with the overarching goal of enhancing research quality and capacity. The RPC is particularly committed to promoting any promising ideas that faculty members believe hold great potential for research. Furthermore, faculty members are actively encouraged to cultivate the research skills of students who exhibit an inclination towards research, even at the undergraduate level.

Research and Project Committee (RPC)

- Rev Fr.Dr Amaldas (Dean, Research and Development)
- Dr Vaishali Singh (Coordinator)
- Mr Yashwardhan Singh
- Dr Nitasha Khatri
- Dr Ankita Rathore

Major Activities held in 2022-23

A. Session on "How to Improve Citation counts & Research productivity"

- Date of event - 26th July, 2022
- Description: In the month of July: RPC organized the special guest session on "How to Improve Citation counts & Research productivity" by Prof. Prakash Chand, Head, Indian Citation Index, Ex-Scientist NISCAIR (CSIR) New Delhi on 26th July, 2022 under the aegis of 5-day Capacity Building Workshop for Teaching & Non-Teaching Staff on Understanding Research & Best Practices for the Institutional Development. Dr Vaishali Singh, coordinator of RPC took

a brief session for staff on "Enhancing the Research Profile through various Research platforms"

- Resource person: Prof. Prakash Chand, Head, Indian Citation Index, Ex-Scientist NISCAIR (CSIR) New Delhi
- Target audience: College Faculties (Teaching Staff)
- Learning Outcomes: Teachers created Google Scholar Link, ORCID record, Web of Science Researcher ID, Vidwan ID, Scopus Author ID.

B. Session on “Introduction to Key Elements of Research, IIC and IPR area/s at undergraduate level”

- Date of event- 15 September 2022
- Description: In the Month of September: 7 Days Deeksharambh - Student Induction Programme (SIP) Session 2022-23 was organized in which students were informed and introduced with the Key Elements of Research, IIC and IPR area/s through one day session.
- Resource person: Dr Shikha Arora Bakshi, IQAC Assistant Coordinator
- Target audience: First Year Students
- Learning Outcomes: Students were able to understand the importance of Certificate Course/ Add-on- Courses/ Short Term Course and MOOCs/ SWAYAM, Innovation & Incubation Cell, Intellectual Property Rights Cell, Research & Projects, International Conference

C. 2nd National Symposium on “The Impact of Socio-economic Policies on Global Development”

- Date of Event: 13-14 March, 2023
- Description: The Research and Project Committee (RPC), St. Xavier’s College, Jaipur in collaboration with Innovation & Incubation Cell (IIC)/Innovation Council and Intellectual Property Rights Committee has organized the 2nd National Symposium on “The Impact of Socio-economic Policies on Global Development” scheduled on 13-14 March, 2023 under the aegis of IQAC. The program was organized online. The objective of the Symposium was to inculcate and promote the values of research and research methodology among young students. It also aimed at ensuring that the research and development activities of the college conform to all applicable rules and regulation as well as to the established standards and norms relating to safe and ethical conduct of research. The program began with a welcome and introduction of the dignitaries from the management and resource person Dr. Tanushree Sharma, for the day. Fr. Dr. Raymond Cherubin, S.J., Vice Principal and Fr. Dr. Amaldass, S.J., Dean, Research and Development, graced the occasion with their inaugural address and guided the students towards the multidisciplinary approach towards policy making. Dr. Vaishali Singh, the convenor of the National Symposium

presented an overview of the symposium. She mentioned that research is the backbone of any institution for its academic growth. After giving the details of the 2-day Symposium, ma'am also brought into our notice that about 17 Papers were received for presentation and more than 45 students participated in the symposium. This was followed by unveiling of the 4th edition of 'Inquest', the research project book 2021-22 with ISBN number. After a short break, the paper presentation session began wherein the students presented their research presentations on varied topics such as, A Study on Current Challenges in Banking Sector: A Literature Review, Analysis of Socio-Economic Factors Affecting the Growth and Development of the Indian Economy in Comparison to Global Economy's Development, Approaches To Leadership- Adoptability to Changing Environment, Contemporary Issues in Management and Technology, Digital Transformation in The Indian Banking System, Education And Human Development, Exploration Of Digital Literacy in Rural Areas, Impact of IOT in Fashion Industry, India's Economy at a Glance; Trends and Outlook for 2035 etc. The paper presentations were followed by the national anthem and group photograph, after which the session came to an end. The session was followed by the valedictory ceremony. The ceremony began with welcome address by Father Raymond Cherubin, Vice Principal, he appreciated and congratulated the participants for their efforts and he also informed about looking forward for more academic programs in college. Best paper presentation was announced for the best presentations/ research works. A complete report of the program was presented by Ms. Anjali Pareek, followed by vote of thanks, which was presented by Dr. Ankita Rathore. In total 45+ students participated in the symposium from various discipline.

- Resource person: Dr. Tanushree Sharma, Associate Professor, MOU and Ph.D. coordinator at Manipal University Jaipur
- Target audience: UG and PG students Learning Outcomes: The outcome of the Symposium was to students were able to understand the values of research at UG & PG level and also were able to understand the key concept of research methodology.

D. 2-Day Workshop on Research Methodology

- Date of the Event: 13 March, 2023
- Description: 2-Day Workshop on Research Methodology organized on 13 March, 2023 by Research and Project Committee (RPC) in collaboration with Innovation & Incubation Cell (IIC) and Intellectual Property Rights Committee under the aegis of IQAC, St. Xavier's College, Jaipur. The session was taken by resource person Dr. Tanushree Sharma, Associate Professor, MOU and Ph.D. coordinator at Manipal University Jaipur for conducting the Worksop on Research Methodology. Mam began with the explanation of what is research methodology. Next, she discussed about the difference between the research

design and Research methods, design process, literature review, research design, sampling methods etc. The session was indeed quite insightful. The second day began with the second session of the Workshop of Research methodology on Data analysis using Excel which was also taken by Dr. Tanushree Sharma wherein she showcased the use of MS Excel in simple data analysis for students. It was a hands-on session where the students practiced the functions and methods of data analysis simultaneously as guided by the resource person.

- Resource person: Dr. Tanushree Sharma, Associate Professor, MOU and Ph.D. coordinator at Manipal University Jaipur
- Target audience: UG and PG students
- Learning Outcomes: The outcome of the Symposium was to students were able to understand the values of research at UG & PG level and also were able to understand the key concept of research methodology.

E. Name of the Work Performed: Publication of Inquest- Student Research Book 2021-22

- Date of the event
- Description: Xavier Research Projects Committee was proud to announce the publication of its fourth volume of Research Project Book “**Inquest 2021-22**”. This book is a compilation of outstanding research projects submitted by undergraduate students who were involved in faculty-mentored research projects and creative activities. This multidisciplinary research project book is an attempt to reveal the types of research activities of the academic session 2021-22 conducted by students. The aim was to enhance the skill set of students and improve their problem solving, critical thinking, and team work skills.
- Target audience: UG and PG students
- Learning Outcome: This book will certainly make a meaningful contribution to the student affairs knowledge base and motivate them for research-oriented activities in future. The book recognizes the efforts of the students and showcases their innovation and resourcefulness.

SPECIAL THANKS AND GRATITUDE

Xavier’s Research and Project Committee (RPC) express our gratitude and conveys a special thanks to the Management, Staff and Students of college for the Academic session 2022-23 for the support and guidance in publishing this endeavor of research.

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CHAPTER 1

A STUDY OF WIDENING GAP BETWEEN EDUCATION AND EMPLOYABILITY AMONG GRADUATES IN INDIA

Manav Narula and Isha Jain

Dr Sunita Choudhary

Abstract

Ceaseless gaps between education and employability of the graduates continue to impact organizational performance and global development. The hope for every college graduate is to get a job. The bubble of their hope expands as they wish to get employed in sectors corresponding to their field of study. Beyond that, they continue to hope to get a sustainable and secured job to enjoy their work-life. Unfortunately, this bubble bursts for most of them, as soon as they get out of their degree colleges. Fresh graduates being the primary stakeholders, eagerly wait for the day they get employed. Similarly, the industries wait for a skilled workforce, ready to hit the ground. Somehow, their demands don't match and both of them lack what they wished for. According to a study, millions of graduates are produced by the Indian universities every year, but only 20% of them get absorbed into various industries, which is alarming. The turbulence brought by the Covid-19 pandemic has exacerbated the crisis for the youth of the country. This paper seeks to find out and bridge the gap between education and employability of graduates in India; based on the analysis of a survey using structured questionnaires involving both the employees and the HR Executives.

Keywords: Skilled Workforce, Unemployment, Ceaseless gaps, Education

Introduction

Employability is a vital concept in higher education and it is considered as one of the factors to assess the country's socio-economic infrastructure. Graduate employability can be expressed as the compilation of a series of soft and hard skills that a graduate obtains to achieve a desirable job requirement and succeed in their career (Aniss Moumen, 2021. SHS Web of Conferences 119, 05010). According to a study, a large number of graduates in India are forced to take up jobs much below their educational qualifications or enter into unsuccessful entrepreneurial pursuits. This has created a new kind of demand-supply imbalance among the graduates being at the same time, over and under-skilled.

Statement of the Problem

Unemployment is a dismaying situation, within which lies a much worse concern of educated unemployment. One of the main objectives of graduation is to enable the students to find suitable employment opportunities in their desired field (Sarin, Charu. (2019). Analyzing Skill Gap between Higher Education and Employability). Due to persistence gaps between education and employability, only a small percentage of graduates are able to find jobs and the rest remain unemployed. The expanding size of the educated unemployed has led to a situation of distress and conflict among the graduates, where the privileged section has the option to fly abroad for better job prospects, the middle class has to resentfully settle with whatever they have and the underprivileged or under skilled are thrown out of the race. The transformation of India into a knowledge-based economy is evident but still, the country's performance on the education and employment front has been below average. The tragic irony is that despite being the 6th largest economy in the world, India's employability worldwide ranking is not at all satisfactory.

The root cause of this issue is unskilful schooling and insufficient education at degree colleges, due to which students are not job-ready and there is a gap between the skill set of the graduates and the expectations of the employers. It is now no longer sufficient for a fresh graduate to possess only academic knowledge as employers expect analytical and practical knowledge of the subjects, but since they don't possess it and get defeated in the screening process itself. Thus, having the desired employability skills is highly crucial to enhance their job opportunities. Pay scale and type of job also play a crucial role in the unemployment concern among graduates as these are one the main reasons behind voluntary unemployment. After completion of their degree, every graduate has some essential expectations regarding the jobs and if they don't get fulfilled, they voluntarily remain unemployed, worsening the problem of unemployment.

The study investigates the following questions:

1. Why is there a gap between the demand and supply of employable graduates? (Q1)
2. What makes a candidate more desirable for employment? (Q2)
3. To what extent is the transition from degree to skills true when it comes to employability? (Q3)
4. What is the major skill mismatch that exists in the marketplace? (Q4)
5. What skills does the employer look for while hiring that the graduates are missing? (Q5)

Significance of the study

Fresh graduates are met with the challenge of education and skills in this rapidly changing work environment. Today we see a lot of new work markets that were not there in the past. There is a huge pool of educated university graduates with unfulfilled aspirations. This group of dissatisfied, disgruntled youth can lead to disastrous consequences for our society (Mahajan, Shobit (2021), Indian Express). Students who graduate, wish to get the desired job but don't get it most of the time. The faulty education framework is somewhere responsible for the concern.

The current education system does not adequately focus on skills that can improve employability, and a large section of labour possess outdated skills (Institute of Rural Management Anand, IRMA, Mangalpura, Anand, Gujrat). Employers expect that students will be “work ready” after college graduation, having the hard and soft skills that are necessary for the workplace. Unfortunately, many graduates fail to possess these skills resulting in making them undesirable employees. Not just the technical skills but recognizing the importance of soft skills and their impact on specific workplaces is one of the pilot steps that need to be taken corresponding to the needs of our global economy. In addition, according to nearly 75% of employers, candidates who have relevant work experience through internships, make them more preferable. Employers use internships as training programs to evaluate if the candidate has desired skills to convert from an intern to an employee. The educators focus on making the student understand a theory and the employers focus on putting that theory into real-time practice. Learning the employer's need and making a connection between theory and practice can make a student more desirable for the position. Therefore, this education-employment gap could be bridged through internships, where educators, employers, and students come together to provide a learning experience on multiple levels.

Fig 1: Unemployment Rate in India in 2021

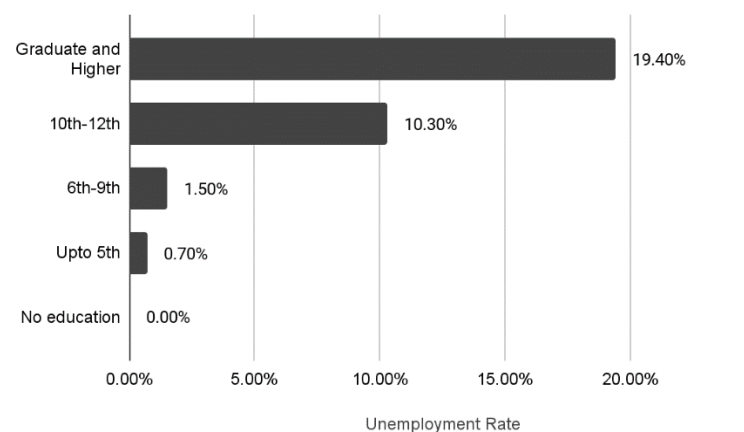


Figure 1: Unemployment Rate in India in 2021

Source: Statista 2022: India’s Unemployment rate by Education in 2021

A survey was conducted by the Centre for Monitoring Indian Economy Pvt. Ltd, (CMIE) between September and December 2021 among the rural and urban households in India. It showed that people who were graduates including those who went further for higher studies had the highest unemployment rate in India in 2021, being 19.4 percent. Individuals who completed their higher secondary education(10th-12th) followed this, with an unemployment rate of 10.30 percent. This trend continues, as the level of education is reduced, the rate of unemployment is also reduced.

Methodology

An online survey was conducted for the graduates and employers to understand the perspective on graduate employability. The sample size was 50 & 25 for graduates and HR Executives respectively. Separate questionnaires were created keeping in mind the respective requirements

of both the stakeholders. The questions were based on a five-point Likert scale and multiple-choice questions were also designed for a better understanding. No subjective questions were asked from the respondents.

The survey was created on a platform called 'Google Forms'.

Some secondary data, from previously published research and other government websites and reports, were also analyzed for the study.

Objectives

- To examine the widening gap between education and employability for graduates in India
- To examine various factors that are responsible for the gap
- To identify the areas and solutions to bridge the gap

Review of Literature

Jeemol Unni (2016) identified the skill mismatch in the labour market in India. She also studied the nature of tertiary education, occupation, and industry. The major discussion of the study was about the skill gaps in graduate-intensive occupations, high technology manufacturing, and Knowledge-Intensive Services. The study also analyzed the skill mismatch and closing that gap was one of the key objectives.

Charu Jain (Assistant Professor, Delhi Institute of Advanced Studies; 2019) conducted a study to know the perception of both the stakeholders (i.e., Employees and Employers) about the skills necessary for employment. The study used the Likert scale to derive useful insights and based on the mean score, it established a ranking order to ascertain the existing skill gap. The findings of the study gave a different picture, where the highest skill gap exists in terms of behavioural skills, according to both the graduates and HR Executives. It also provides recommendations to bridge the skill gap which needs to be incorporated by both the stakeholders.

Tim Goles and others (2011) in their study, suggested a typology of IT skills. To find out, the researchers gathered data of 96 IT managers and executives. They found out and refined the six categories of skills: foundational, operational, essential, project management. And opportunity skills.

Deepa KT and Shanmugam P. (Department of Economics, St. Thomas College, MG University, Kerala, India) along with Archana Jayaram (Department of Economics, Bharathiar University, Tamil Nadu, India; 2019-20) studied the socio-economic characteristics of the respondents residing in the Coimbatore district. It also traced out the gap between education and employment based on a field survey conducted in the area and concluded that skill and experience along with proper educational qualification have a significant impact on employment. There is a positive relationship between education and employment prospects.

Aya Okade (2012) studied and re-evaluated the current state of education, skills development, and employment for the youth in India. They stated that India is suffering from a deep shortage of skilled workers. The reasons they gave for this are a large mismatch in the labor market, limited access to education and skills training, and high rates of school dropout. The paper also recognized the skills gap in India between the skills young people possess and what industries demand.

Monika Aring (2012) conducted a study and drafted a report which reviewed the literature on 120 employer surveys from developed and developing countries which derived the employers' perspective on skill gap and it indicates that employers throughout the world consider "talent" or "skill gap" as one of their top 5 concerns. This study reveals the extent of the skill gap in various countries, describes some of the major causes of the skills mismatch and reveals what employers actually mean when they state that graduates are not "employable".

Vikhe Gautam (2014) studied the gap between academia and industry. They also revealed that, over employability skills, a gap exists between HR managers and training and development officers. They pointed out the need for collaboration of both industry and academia for a win-win situation.

Ming Cheng, Olalkekan Adekola, Jo Clarisse Albia, and Sanfa Cai (2021) pointed out in their study that despite the clear evidence that the responsibility of employability needs to be shared by all key stakeholders, it has been transferred to the Higher Educational Institutions by the UK government. The study also pointed out the gap between employers' expectations for employability and the government's employability agenda.

R. Mary Metilda and Neena P.C (2016) identified the employability skills that were necessary for employment. The purpose of their study was to investigate the gap between the skill set of business graduates expected by the employers and the actual skill set the graduates possess at the time of recruitment.

Thijs Van Rens (2015) in his CAGE/SMF research paper series studied the US data and stated that 60% of the employers of US believed in these reasons for the skill gap: First, workers do not adapt to changes in skills demand by attaining the necessary skills they need to find a job. Second, firms do not accommodate changes in skills supply by creating jobs that use skills that are available in the labor market. Third, lack of wage-based incentives for the workers to acquire scarce skills. The researchers suggested that the skill gap will not reduce by increasing the emphasis on scarce skills in schools, colleges, and universities. If wage-based incentives for certain skills won't be there, students will either reject to acquire these skills or will find employment in some other occupation.

According to Dr. Atma Ram, ex-Director General of Council of Scientific and Industrial Research, the problem of unemployment had emerged from the mismatching of academic progress and economic growth. The rate of increase of educated personnel is outrunning that

of the economic growth. The real economic situation and need for the country are paid a little heed by the worn-out education system.

Results and Discussions

Existence of the gap

There is a gap between education and employment due to both lack of sufficient jobs and lack of appropriate skills possessed by candidates. This accounts for the reason behind the unsuitability of a large number of graduates for employment that are commensurate with their degrees. Nearly half of the undergraduate students (i.e., 80% of the total number of the students) are enrolled in disciplines that are least employable. According to our survey, the gap exists due to skill mismatch and the lack of industry knowledge.

According to the survey, 80% of employers believe that technical skills are more important whereas 90% of employees on the other hand consider communication skills to be of high value. This has created a mismatch between both perspectives and has increased educated unemployment in India.

Such gaps can exist sector-wise as well. For instance, the tech industry, to begin with, is facing a shortage of tech talent. According to a study conducted by NASSCOM (National Association of Software and Service Companies), the gap exists all over the world. India's tech demand-supply gap of tech talent in 2020-21 is around 21 percent. Accordingly, the construction sector accounts for a total of 11 percent of the Indian GDP and is the largest employer after the agriculture sector. According to a survey by Global Data, which is a leading analytics company, the pandemic has caused a beating to India's construction industry. The construction industry is also facing a shortage of professionals and skilled talent necessary to recover it from the turbulence caused by the pandemic. According to a research report titled "Real Estate Construction Professionals in India in 2020", by the Royal Institute of Chartered Surveyors (RICS), the number of professionals, and the skillsets for core professionals in this industry has a demand-supply gap of about 85%. Furthermore, according to the C. Madhusudhan Reddy (Chief of Andhra Pradesh State Skills Development Corporation), the drugs & pharmaceutical industry is also going through a serious situation where only 5% of the total graduate were able to secure jobs in this industry in 2020 and the remaining 95% were not possessing the necessary skills.

Reasons for the gap

HR Respondents believe that technical skills are most important whereas the employee respondents think communication skills are. This mismatch acts as one of the roots of the problem of educated unemployment. The on-the-job training of an employee is an additional cost that the company has to bear on new hires. The candidate having the technical skills would always be preferred over the candidate having no or little technical skills. There has to be a balance maintained between soft and hard skills. Focusing on one of them and neglecting the other is not a wise decision. The lack of industry knowledge also plays a vital role in the existence of the gap and serves as a reason behind the unemployment of the youth in India.

According to the survey, almost 65% of employers and 70% of employees believe that internships and apprenticeships are crucial for a job. Having relevant work experience helps the candidate stand out and also builds professional faith in the candidate. Unfortunately, 40% of employees stated that there are no industry-based mentorships and internship opportunities are offered in their institutions. Thus, both skills and work experience help candidates pave their way through the work market.

India produces around 2 million STEM graduates across all fields including undergraduates, postgraduates, and Ph.D. students. Among these, only 35% are suitable for employment, and the remaining 65% need upskills of some kind to get a job in the tech field. The study points out that the Indian universities are lagging in terms of industry-academia tie-ups that are necessary to provide training, internships, and learning to graduates to make them market-ready. With the lack of sufficient skilled professionals in the construction industry, the overall cost of the projects increases due to inefficient utilization of resources. The professionals lack in-depth knowledge about the sector and being restricted to limited domains generates this gap. Another factor increasing the demand-supply gap can be drawn from the belief of the employers who think that most of the fresh graduates are highly unemployable, i.e., they are not “industry-ready”. Similarly, due to the lack of required skills, the gap exists in the pharmaceutical sector as well. Another reason would be the lack of experienced people in the industry, which in turn has created an imbalance.

Some other possible reasons that could generate and expand this gap are -

1. **Poor Educational System:**
The education system of India does not develop human resources properly. Proper training is not given to the people who are consistent with the present economic environment. Due to this, even those who are highly educated, fail to get an appropriate job in India. When firms hire a person for a job that requires tertiary education, sometimes the firms complain that the person they hired didn't have the quality skill that was required for that job. Thus, when a person with higher education fails to possess certain quality skills, it adds to the firms' on-the-job training costs. This is a result of the poor education of the existing higher education system in India.
2. **Market conditions:**
When a student is enrolled in high school, most of them are uncertain regarding their career paths. They tend to select the institutions under the influence of their parents, peer groups, or teachers. The student's expectations tend to coincide with reality after a period of time. According to the market conditions and expectations at the particular time period, they need to reconsider their career paths. This time period actually contributes to expanding the existent gap.
3. **Over education:**
From an economic point of view, being over-educated can also act as a reason for unemployment. The term overeducation refers to when a graduate exceeds their optimum level of education. The overeducated graduates will not compromise on the

normal pay scale and will try to find a job according to their educational level. Despite of the law of labor supply and demand which states that they should get a job regardless of their education level over-education creates conflict as graduates want to earn more due to the educational qualifications attained by them and the employers doesn't have a suitable job that justifies their qualifications. This leads to a wastage of resources and time invested in attaining that education.

4. The imbalance between perspective and realities:

After graduating, the student interacts with various sources regarding the process to go ahead in their career and find a suitable job. They tend to formulate their own ideas and expect outcomes. Whereas the market requires different sizes of labor forces to meet the needs and requirements. The employer's point of view may sometimes differ from that of the graduates while hiring, leading to unemployment.

5. Skills and ability to hire:

The process of hiring does not only involve educational qualifications but also looks upon the background of the candidate. Maybe the institutions ignore the importance of skills in the practical world, making it difficult for the graduates to approach their careers. After graduation, it is essential to meet the requirements of a job in order to be hired.

Degree vs. Skills

Students spend one-third of their lives acquiring college degrees to find suitable jobs to live the remaining two-thirds of their lives. According to the World Economic Forum's, Jobs of Tomorrow report, if the focus would shift from degrees to skills, there would be a bigger workforce representing a diverse population and will also help bridge the all too familiar education and employability gap. This would mean transitioning to skill-based education and employment infrastructure that welcomes not just credentials and certifications but also the suitability for the job. Based on the estimates of the Forum, more than 1 billion jobs are likely to be transformed by technology in the coming years.

The future of work won't be about the degrees but skills would take over the lead. A job website called Glassdoor listed the names of 15 companies that no longer require a degree, including tech giants like Apple, IBM, and Google. Many companies are offering well-paying jobs to those with non-traditional education or high school diploma (Kasriel, Stephane, Upwork CEO).

The tasks performed by robots, automation, and artificial intelligence have been increasing with time which is disrupting the jobs massively. Machines are eating humans' jobs and not just the low-skilled or repetitive jobs. Artificial intelligence in recent times has shown equal or better results than humans. (Rainie, Lee (2017). PEW Research Center). According to a study, around 38 million students are enrolled in higher education across multiple degrees and colleges The success measure based on the number of jobs rolled out is less than 10%, i.e., not even 3.7 million students are able to get a job after completing their degrees (Aishe.nic.in report, 2019). This gives a clear representation that the future will not be just about college

degrees and qualifications. Due to the active emergence of the gig economy, the nature of work is more inclined towards skills. Further, the covid-19 pandemic has given fair reasons to students and professionals to accelerate their careers and modern economy by joining upskilling and skilling programs. A degree can earn the job but cannot assist in growing further if not accompanied by skills. Therefore, candidates with just degrees won't be able to pave their way through this disruption. Hence, degrees along with the right skills are required to survive and excel in this automated world where AIs and robots are increasingly becoming better to perform tasks efficiently.



Figure 2 Degree: 12% Skills: 88%

Figure 3 Degree: 22% Skills: 78%

After analyzing the responses from both the employees and the employers. A majority of both the employees and employers (78% and 88% respectively) are firm believers that skills matter more than a degree. Despite this knowledge, the employees are not able to find employment. One of the possible reasons behind this is the skill mismatch. Skill gaps and mismatches basically lead to unfavorable market conditions, youth unemployability, and a reduced pace of economic growth. Skills are not only limited to enhancing workers' productivity but also define the candidate's ability to adapt to the work environment. Some sectors have a larger number of skills than what is required resulting in graduates being underpaid or underemployed. Some sectors that require a high degree of skills that can lead to growth and employment should be prioritized while planning out strategies.

Skill mismatch can be measured using various factors like overeducation (have a level of education beyond what is required), under-education (have a level of education below what is required), over skilled (have a set of skills above what is required), and under skilled (have a set of skills below what is required). Skills can even become obsolete due to aging which degrades manual skills, caused due to technological changes. Skill shortages is another term that is related to skill mismatch in a very practical way. It refers to existent vacancies due to unqualified graduates. As the students are unable to offer what a firm asks them, the consequences are borne by both the stakeholders.

Bridging the Gap

The most crucial goal of education is to act as foundations for employability, but there is a mismatch in the expectation and reality. Upon identifying that mismatch, the bridging of the

gap is the next step to make. The bridging focuses on 2 areas, first, is the skill-based closing of the gap which involves methods and ideas to make the candidates learn the necessary skills. Second, is the initiative-based closing of the gap which involves providing platforms to the candidates and crafting policies to help them get the desired job. Closing the gap can be discussed sector-wise as well. For the tech industry, closing the gap would need the increment in the corporate collaborations in tier II and tier III universities to change the curriculum and add introductory to medium-level complexity courses in the field of tech. Similarly, an NSDC analysis acknowledged that, in order to meet the requirements of the construction industry, the areas of legal knowledge, government regulations, networking, language proficiency, financial knowledge, project planning, and management skills, including applications and use of project management software, must be enhanced. To bridge the pharma industry-academia gap of trained and professional workers, the Indian education system should focus on providing expertise in complex areas. To adapt to the needs of the modern pharmaceuticals, Pharmacy Education in India must take cognizance of the deficiencies and modify their curriculum (FICCI-NMIMS report on Industry-Academia Convergence).

According to the World Economic Forum's Future of Jobs Report, almost 50% of the employees would need reskilling by 2025 since technology is being adopted increasingly. The topmost soft skills that the employers think have growth prospects are critical thinking and problem solving, Flexibility, stress tolerance, active listening, resilience, etc are also emerging as important soft skills to be learned in the discipline of self-management. The forum estimates that 85% of the jobs would be displaced due to the shift from human labor to machines.

Table 1 Top 10 Work Skills required by 2025

Analytical thinking and innovations	Leadership and Social Influence
Active learning and learning strategies	Technology use, Monitoring and control
Complex problem solving	Technology design and Programming
Critical thinking and analysis	Resilience and Stress Tolerance
Creativity, Originality and Initiative	Reasoning and Ideation

(Source: Future of Jobs survey 2020, World Economic Forum)

Some possible areas of solution in order to bridge the gap are -

1. The clarity about the task and the backdrop is necessary when working on a project or anything. Theoretical knowledge is something that college will teach, but applying it in real life is what needs to be figured out by oneself. Employers don't want candidates to memorize and replace textbooks. They want employees who can apply theories in real life to solve practical problems.
2. Theoretical knowledge and understanding are useless if a candidate is not able to express it in a lucid manner. The ability to communicate properly demonstrates confidence. The traditional "one size fits all" method is not enough in the present time.

Students need customized mentoring and the space to evolve as confident individuals, which can be done by making them aware of their individual strengths.

3. Improving the pupil-teacher ratio and skills like public speaking, participation in cultural and sports events, student exchange programs, social work, festivals, etc may help in making a candidate confident for the dynamic work environment.
4. Working as interns or taking part in the family business after college hours or starting any sort of entrepreneurial venture will expose the students to real-life challenges and will also tell them the course of action to deal with such challenges.
5. To enter a corporate world, a graduate must have the requisite skills needed for employment. Academics alone is not enough to make a student work ready; skill development plays a vital role in it. While the student is pursuing their graduation, they can easily enhance other skills like fluency in English, communication skills, behavioural skills, interpersonal skills, etc. Sometimes lack of these skills can affect your chances of getting employed. The main conflict comes when the institution itself lacks in understanding the wants of the market and making their students read according to it.
6. The school and college examinations are more or less structured in a manner to assess the knowledge of an individual in terms of the syllabus and curriculum they have in their course. Assessing the candidate in terms of team building or group work skills is also necessary. Thus, to improve teamwork and related skills, participation in cultural activities or sports can help to a great extent.
7. Professional certifications, such as those offered by Coursera, edX, Udemy, LinkedIn, etc., can help you acquire new skills at a very minimal cost without even going through a regular degree program. These platforms offer thousands of courses taught by experts in their fields. Many companies like Amazon (AWS), Microsoft, etc., offer their own certification programs in various IT-related disciplines. Google has also launched a number of online courses with the duration of 3-6 months which aim to help people find suitable jobs.
8. This world has been moving towards digitalization and soft skills have become key to the modern economy. These soft skills cover a wide range of interpersonal skills such as teamwork, analytical thinking, management, problem-solving, etc. Unfortunately, the current curriculum of colleges and universities do not include these skills.
9. Institute for Electronic Governance; It was initiated by the government of Andhra Pradesh, it's basically a non-profit organization that trains young engineers to assess their knowledge through Jawahar Knowledge Centre (JKC) i.e., main activity of IEG. It is a six months model that can be availed for free. It provides top-level training in technical and soft skills, a 24/7 library, high-speed internet, and separate laptops with an aim to create awareness in society. Rajasthan Skill and Livelihoods Department; Rajasthan has created its own position in the education sector for schools, colleges, etc. This program holds the main agency responsible for skill development across the state. Similarly, Rajasthan Knowledge Corporation was established to develop a fresh educational framework that regulates the development needs for IT skills.
10. The main and primary role of higher education institutions is to provide their students with knowledge, skills, and abilities to enter the corporate world. The industry and the

educational institutions should ensure that a common platform is available for the students to carry out value-based curriculum keeping in mind the wants of the market. To reduce the employability gap, we must take action to reduce the existing gap between the industry and faculty. The educational institutions should at least make the student ready to adjust to different cultural settings.

11. Having the skills and not being able to use them is of no use. It is very important to identify your skills, organize them, plan them and use them according to the situation. Sometimes a person lacking some of the skills can get the job because he/she knows how to handle the situation better than the other. To incorporate these skills in the graduates the institution must conduct different activities like brainstorming, role play, simulation, fieldwork, teamwork and site visits, etc.

The changing market situations and the high shifting prospects from human labor to machines suggest that demand for some jobs will increase over the next five years, while for others it will shrink. Candidates aligning their skills with the job positions that have a high demand in the future will flourish in their careers and will be able to sustain longer in their desired jobs. Some of such high and low-demand jobs of the future are listed in the table below.

Table 2

S. N	Increasing Demand	S. N	Decreasing Demand
1	Data Analyst and Scientists	1	Data entry clerks
2	AI and Machine learning specialists	2	Administrative and executive secretaries
3	Big Data specialists	3	Accounting, book-keeping and payroll clerks
4	Digital Marketing and strategy specialists	4	Accountants and Auditors
5	Process automation specialists	5	Assembly and factory workers
6	Business Development professionals	6	Business services and administration managers
7	Digital transformation specialists	7	Client information and customer service workers
8	Information security analysts	8	General and operations managers
9	Software and application developers	9	Mechanics and machinery repairs
10	Internet of things specialists	10	Material recording and stock-keeping clerks

11	Project managers	11	Financial analysts
12	Business services and administration managers	12	Postal services clerks
13	Database and network professionals	13	Sales rep, wholesale and manufacturing, technical and scientific products
14	Robotics engineers	14	Relationship managers
15	Strategic advisors	15	Bank tellers and related clerks
16	Management and Organization analysts	16	Door-to-door sales, news and street vendors
17	FinTech engineers	17	Electronics and telecoms installers and repairs
18	Mechanics and machinery repairs	18	Human resource specialists
19	Organizational development specialists	19	Training and development specialists
20	Risk management specialists	20	Construction labourers

(Source: Future of Jobs survey 2020, World Economic Forum)

Conclusion

The purpose of the study was divided into 3 stages, identifying the gap, finding out the reasons behind the gap, and discovering areas and solutions to bridge the gap. The perspectives of both the employers and the employees were recorded through an online survey.

The findings of the paper indicate that the gap between education and employability exists due to a mismatch in skills. HR executives consider technical skills to be of high value and on the other hand, employees give importance to communication skills. But, in reality, both of these are equally important to secure a job, and thus focusing on one and neglecting another is not preferred. Since both stakeholders believe that skills matter more than a degree, this paper supports the saying that “skills, not a degree, will shape the future of work” Another finding recommends that in order to satisfy the requirement needed in the labor market, academic institutions and employers should collaborate to derive strategies and frameworks to enhance employability. Also, prospects the internships and apprenticeships need to be expanded because employers prefer those who are ready for the work market and have some real-life experience. The skill gap also is quite evident due to the mismatch in the perspectives and expectations of both the stakeholders which indicates that a communication gap exists between universities and employers which needs to be addressed as well. The skilling ecosystem in India has been improving every day and has witnessed some great policy reforms that might act as strong foundations and will create a stable platform for all the stakeholders. Hence, it is

essential to note that a more stable mechanism needs to be established between educational institutions, government, and industry in order to make more flexible and reliable policies.

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CHAPTER 2

RESEARCH PAPER ON THE ROLE OF EDUCATION IN HUMAN DEVELOPMENT

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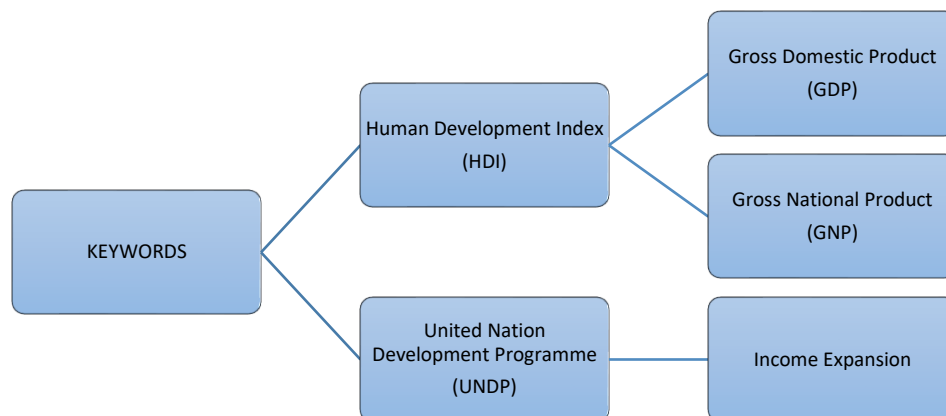
ABSTRACT

As Nelson Mandela said, ‘Education is the most powerful weapon which you can use to change the world’. When the world is filled with deadly weapons, it is education that is the real asset that can develop an individual as well as a nation. Education shapes us socially as well as economic progress as our perspective of the world changes. Human development is defined as an expansion of human capabilities, a widening choice, an enhancement of freedom, and a fulfillment of human rights. In the beginning human development incorporates the need for income expansion. However, income growth should consider the expansion of human capabilities. Hence development cannot be equated solely to income expansion. Based on this, the human development index(HDI) is constructed as a more humane measure of development than a strictly income-based benchmark of per capita GNP. Education improves the livelihood of more job prospects.

It produces a clever, well-informed populace, stimulates economic growth, and raises a country’s GDP. An educated society comparatively has a lower poverty rate than an illiterate society. A steady income can alleviate poverty and enable us to live better lives. Human capital is directly related to human development. When there is human development, qualitative, and quantitative advances in the nation are unavoidable. Human capital is the instrument for promoting the comprehensive development of the nation. Due to qualitative improvement in each generation, India’s rate of human capital formation has steadily increased since ¹independence. The third generation of India’s population is actively working in the country’s workforce. The third generation has boosted India’s service industry and improved the invisible balance of payment with the export of financial services, software services, and tourism services. In a developing country like India, more than half of the population lives in a rural region.

Almost all of India’s states such as Bihar, Madhya Pradesh, Rajasthan, and Jharkhand are still underdeveloped. Even from space, India is renowned to have the biggest slum areas which can be seen in Mumbai. These people are backward in every sense, even though the country is developing. If these people were given access to education, they would become literate and contribute significantly to the growth of the economy. An increase g number of women have

been joining the economic sphere, seeking paid labor outside the home during the last quarter of the twentieth century, and especially with the opening up of the economy, post-1991.



INTRODUCTION

The Human Development Index (HDI) is a statistical tool that is used to measure the social and economic development of a country. It was created by the United Nations Development Programme (UNDP).

The HDI measures three dimensions of human development

Health: This dimension is measured by life expectancy at birth.

Education: This dimension is measured by the average years of schooling and the expected years of schooling.

Standard of living: This dimension is measured by gross national income (GNI) per capita.

The HDI is calculated by combining these three dimensions into a single index, which ranges from 0 to 1. A higher HDI value indicates a higher level of human development.

The HDI is widely used by policymakers, development practitioners, and researchers to monitor and evaluate the progress of countries toward human development goals. It is also used to identify areas where additional investment and policy interventions are needed to promote human development.

While the HDI is a valuable tool for measuring human development, it has been criticized for its focus on the average level of development in a country, rather than the distribution of development across different segments of the population. Critics argue that a more nuanced measure of human development is needed to capture the experiences of marginalized groups and to ensure that development benefits all members of society.

Human development focuses on assisting students so they can have a better educational experience. Being able to have a rich and safe education is a human right. The role of education in human development is of great importance in today's society. Education is a fundamental right and a key factor in the development of individuals, communities, and nations. It is an important tool that helps people to realize their full potential and improve their lives.

It provides individuals with a wide range of benefits, including:

1. **Personal development:** Education helps individuals to develop critical thinking skills, problem-solving abilities, and effective communication skills. It promotes personal growth, self-awareness, and self-esteem.
2. **Social development:** Education provides individuals with the knowledge and skills necessary to participate in society. It fosters social cohesion, cultural understanding, and tolerance. Education also helps individuals to develop empathy, compassion, and leadership qualities.
3. **Economics Development:** Education is a key driver of economic growth. It provides individuals with the necessary skills to participate in the labor market and contribute to economic development. It helps to reduce poverty and inequality by providing individuals with the opportunity to their economic status.
4. **Democratic participation:** Education is essential for democratic participation. It provides individuals to participate in community activities.
5. **Sustainable Development:** Education is critical for sustainable development. It provides individuals with the knowledge and skills necessary to understand the complex challenges facing our world and to develop sustainable solutions.

HISTORY OF EDUCATION

Early education in India commenced under the supervision of a guru or preceptor after initiation. Education was delivered through Gurukul. The relationship between Guru and his Shishya (students /disciples) was a very important part of the education. [Taksha Sila (in modern-day Pakistan) is one of the example of ancient higher learning institute in India from possibly 8th century BCE, however, it is debatable whether it could be regarded a university or not in modern sense, since teachers living there may not have had official membership of particular colleges, and there did not seem to have existed purpose-built lecture halls and residential quarters in a Taxila, in contrast to the later Nalanda university in eastern India. Nalanda was then oldest university-system of education in the world in the modern sense of university. There all subjects were taught in the Pali language.

Secular institutions cropped up along Buddhist monasteries. These institutions imparted practical education, e.g., medicine. The number of urban learning centers became increasingly visible from the period between 500 BCE to 400 CE. The important urban centers of learning were Nalanda (in modern-day Bihar) and Manassa in Nagpur, among others. These institutions systematically imparted knowledge and attracted a number of foreign students to study topics such as Buddhist Páli literature, logic, páli grammar etc. Chanakya, a Brahmin teacher, was among the most famous teachers, associated with founding of Mauryan Empire.

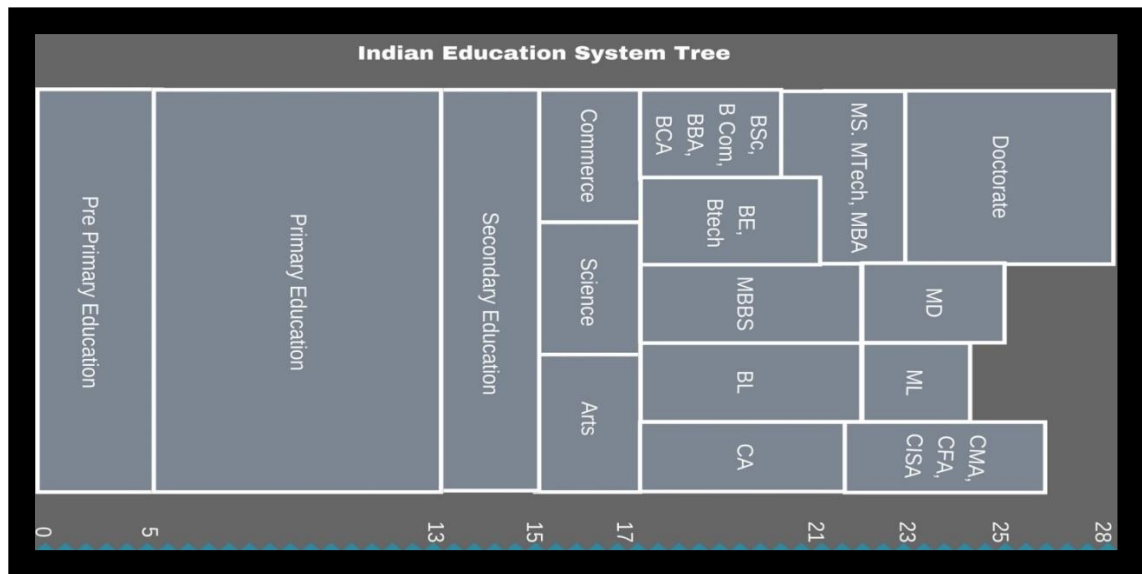
Shramanas and Brahmanas historically offered education by means of donations, rather than charging fees or the procurement of funds from students or their guardians. Later, stupas and temples also became centers of education; religious education was compulsory, but secular subjects were also taught. Students were required to be brahmacaris or celibates. The knowledge in these orders was often related to the tasks a section of society

had to perform. Arts, crafts, Ayurveda, architecture were taught with the advent of Islam in India the traditional methods of education increasingly came under Islamic influence. Pre-Mughal rulers such as Qutb-ud-din Aybak and other Muslim rulers-initiated institutions which imparted religious knowledge. Scholars such as Nizamuddin Auliya and Moinuddin Chishti became prominent educators and established Islamic monasteries. Students from Bukhara and Afghanistan visited India to study humanities and science. Islamic institution of education in India included traditional madrassas and maktabas which taught grammar, philosophy, mathematics, and law influenced by the Greek traditions inherited by Persia and the Middle East before Islam spread from these regions into India. A feature of this traditional Islamic education was its emphasis on the connection between science and humanities. British rule and the subsequent establishment of educational institutions saw the introduction of English as a medium of instruction. Some schools taught the curriculum through vernacular languages with English as a second language. The term ‘pre-modern’ was used for three kinds of schools – the Arabic and Sanskrit schools which taught Muslim or Hindu sacred literature and the Persian schools which taught Persian literature. The vernacular schools across India taught reading and writing the vernacular language and arithmetic. British education became solidified into India as missionary schools were established during the 1820’s.

INDIAN EDUCATION SYSTEM

India’s education system can be traced back to around 5000 BC, when the Gurukul system of education was responsible for imparting education in India. The mode of teaching at that time was Sanskrit. With changing times and modern equipment education in India experienced a drastic change. The Current Education System in India emphasizes fostering qualities like confidence, good practices, sympathy, and imagination. It is a complete blend of culture, history, and human values. India is a democratic country guided by the principles of the Constitution. Article 21A provides free and compulsory education of all children in the age group of six to fourteen years as a Fundamental Right in such a manner as the State may, by law, determine. To ensure compliance with the said article, the parliament enacted the Right to education Act of 2009. Under this act, free and compulsory education is ensured for every child from 3 to 18. India has always paid special attention to the education sector.

Stages of Current Education System in India



The Current Education System in India consists of the following stages: -

☐ **Pre School-Stage**

This is a stage where a child joins a kindergarten when the child is 3 - 8 years of age. This stage will include play or activity-based learnings and the improvement of language abilities. It is crucial as the child 50% brain develops at this stage only.

☐ **School Stage**

A child enters a school at the age of 8 or 9 years and remains there till the age of 18, starting from nursery class till class 12. At this stage, a child gets an opportunity to learn lots of subjects. By that time, he develops an interest in them which helps him to pursue his higher education.

☐ **Higher Education Stage**

After completing school, a student enters a college or university at the age of 18 – 19 years. In India, a student first acquires graduate degrees in horticulture, designing, pharmaceuticals, and innovation generally requires four years to finish. Law, medication, and engineering can require as long as five years.

After graduation, a person applies for a post-graduation degree from a recognized university.

☐ **Doctoral Stage**

This is the last stage in Education in India. After completing post-graduation, a Student who wishes to study further applies for Ph.D. and Doctoral courses. It is the highest education qualification that a person can acquire in India. After successfully completing this stage, a student is conferred with the prestigious title of a “Doctor (Dr.).”

School System in India

In India, after the preschool stage, the school system starts from class nursery to class 12. Here, till class 10, a student must study all subjects such as English, Hindi, Math, science,

and human values. After class 12, a student can opt for either arts or commerce or science as per his interest. Understudies need to generally gain proficiency with a typical educational plan until the finish of secondary school. Understudies all through the nation need to learn three dialects English, Hindi, and their first language (optional).

Higher Education System in India

Higher Education in India is governed by University Grant Commission. Indian higher education framework has extended at high speed by adding almost 20,000 colleges and more than 8 million understudies in 10 years from 2000-01 to 2010-11. As of 2020, India has more than 1000 colleges and universities, 416 state colleges, 361 private colleges, and 159 Institutes of National Importance, which incorporate AIIMS, IIMs, IITs, IISERs, IITs, and NITs.

Some of the undergraduate courses in India are as follows: -

- ☐ B. Tech
- ☐ LL.B.
- ☐ B. Com
- ☐ BBA
- ☐ BA
- ☐ B. Pharma
- ☐ MBBS

Some of the Postgraduate courses in India are as follows: -

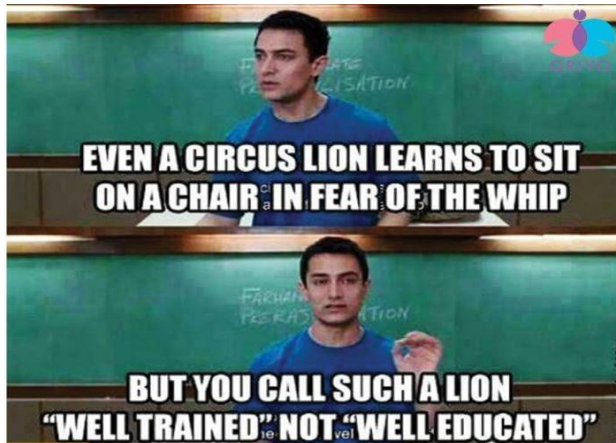
- ☐ M. Tech
- ☐ L.L.M.
- ☐ MA
- ☐ MBA
- ☐ MS
- ☐ M. Com

A student can pursue any course after fulfilling its requirement from any college or university in India.

Problems in the Indian education system

We can develop the Best Education System in India by abolishing the following factors:

1. ROTE LEARNING



Indian Education System is all about rote learning, students are emphasized to remember contents of the book or documentation rather than developing their logic, thinking, and intuition. Memorization has become the key to top the exams. Even several coaching centers believe in teaching the tricks to solve entrance test questions rather than concept. Fact: You can't keep everything in your mind for eternity because you will forget things that are not used for a while. Even computer hard drives start to lose data after a while.

2. Too much competition



In a perfect world, a student with a score of at least 90% would be regarded as intelligent. This viewpoint needs to alter, though. A student who had a lower score might nevertheless be intelligent and competent. A student's IQ cannot be determined by their grades. By altering the way exams are administered, technology could be able to address this problem. Tech solutions are now assisting in improving communication skills, and teaching and testing practical knowledge. They are also engaging students in extracurricular activities in place of hour-long exams that are once again focused on theoretical aspects.

3. EDUCATION GIVEN IS IRRELEVANT TO JOB MARKET



This is perhaps the most apparent failure of our education system that after completing graduation in any discipline students are not able to get jobs. It is simply because skills that are required in a job market are not present in a fresh graduate. As per a recent survey, one out of five graduates ever had vocational training & only 10% of manufacturers in India offer in-service training to their employees compared with over 90% in China

1. Getting a job is an ultimate goal



- 2.

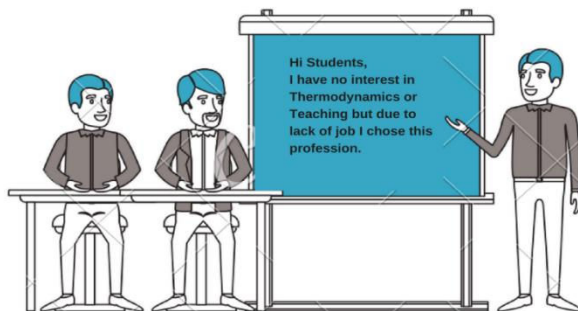
The ultimate goal of education in India is to get a job not to learn or innovate. Choosing for their passion as a profession or becoming an entrepreneur is a myth. This lack of ambition does not allow our country to excel in any field. This attitude of our children making them slaves of a few multinational companies. Somebody, please tell them if they are not working for own their dreams then they will end up working for someone else dream. However, the sad truth is that India is a country where students with new ideas & dreams are not invited or supported by their friends & families.

5. RESERVATION SYSTEM



This point comes into action after the completion of your higher secondary education. This is the time when you come to know it's not only about getting good marks. Someone with 50% of your marks might get a better college or job. Reservation system acts as a Silent Killer of India. It began in 1982 when the constitution decided that 15% and 7.5% of the government jobs quota be reserved for SC and ST (Scheduled castes and ethnic groups) respectively, and this number will be reviewed after five years. In the 1990s, the Indian Prime Minister Vishwanath Pratap Singh declared a 50% reservation for admissions and jobs in all government bodies. And the rest is history.

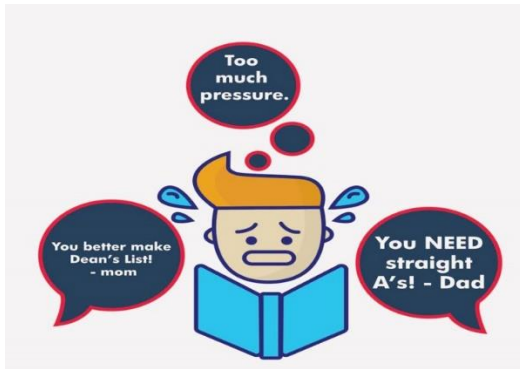
6. Teaching is not a Profession anymore



Teaching is not a Profession anymore!

Unfortunately, the honored profession of teaching is no more honored. Very few teachers of today are teachers by choice or by desire. The rest are all there because they could not find another job or they did not have a choice. The passion to learn so they can teach their students does not exist in the teachers anymore. In fact, Teachers hardly exist anymore. The biggest reason behind this is that there is no test/exam for the selection of teachers in India whereas Finland [best education system] selects only top ten applicants for teaching jobs.

7. Too much pressure on grades



In the education system in India, a student's intelligence and performance are thought to be mostly determined by their grades. Additionally, extracurricular activities are viewed as a detour from academics. This thought stems from the idea that only professionals like doctors, lawyers, engineers, and chartered accountants are good and everybody wishes their child to become one of these. To achieve that, one has to get 99.9% in India. this shouldn't be the case, students should be encouraged to follow their hobbies and make a career in the same.

HOW TO FIX INDIAN EDUCATION SYSTEM?

Government Initiatives: The Government has come up with several schemes to overcome the challenges of the Indian education system.

- **Beti Bachao Beti Padhao:** Launched in 2015, the Beti Bachao Beti Padhao Yojna by the Government of India. It was an initiative to protect the survival of girl children and promote education.

- **Poshan Shakti Nirman:** Another Government of India undertaking, the Poshan Shakti Nirman is to provide hot and nutritious mid-day meals to Government Institutions and Government schools. The program was initiated to provide food for students and will also encourage students to attend schools.

- **Sarva Shiksha Abhiyan:** The Sarva Shiksha Abhiyan was started to achieve Universalization of Elementary Education. Apart from these plans, the Government of India allocates a budget for the promotion of education in the five-year plans. Several Government scholarships are also offered to deserving students.

Investing in teachers: Teachers are the backbone of the education system, and investing in their professional development can improve the quality of education. Providing teachers with ongoing training and support, higher salaries, and opportunities for career advancement can help retain qualified teachers in the system.

Embracing technology: Technology can enhance the learning experience by providing interactive and engaging ways to teach and learn. Integrating technology in the classroom, such as using educational apps, online resources, and virtual reality, can help students to develop skills that are essential in the 21st century.

Fostering a culture of learning: Education should not be limited to the classroom but should extend beyond it. Encouraging lifelong learning, providing opportunities for community engagement, and creating a supportive learning environment can motivate students to be active learners and contribute to their personal growth.

Addressing inequality: Educational inequality remains a significant problem in many countries. Addressing this issue requires a multi-pronged approach, including providing equal access to quality education, eliminating discrimination, and addressing the root causes of inequality, such as poverty and social exclusion.

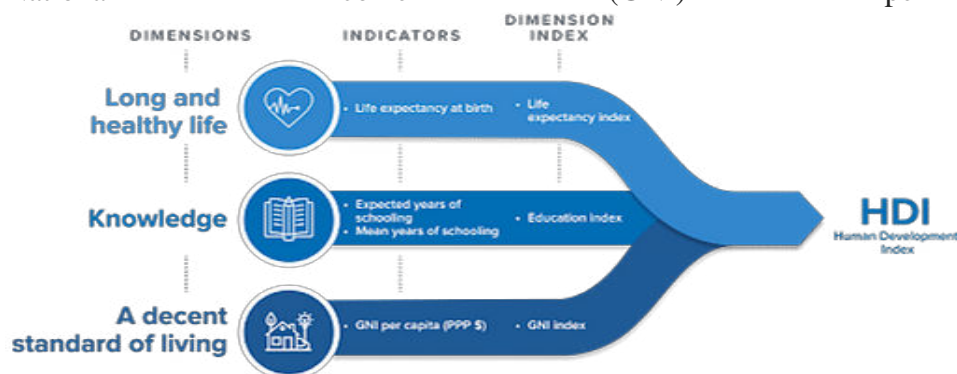
Personalizing learning: Every student has unique learning needs and preferences. Personalizing learning help can help cater to these needs by tailoring the learning experiences to each student's pace, interests, and learning style. This can be achieved through adaptive learning technologies, flexible teaching methods, and individualized support.

Reducing class size: Large class sizes can limit individual attention and hinder student learning. Reducing class size can improve the quality of education by allowing teachers to provide more personalized instruction and feedback to students.

Increasing parental involvement: Parental involvement in education can positively impact achievement. Providing parents with regular updates on their child's progress, involving them in school activities, and creating opportunities for parent-teacher communication can improve student's engagement and motivation. These solutions are not exhaustive, but they can serve as a starting point to address the challenges in the education system. Implementing them requires a collaborative effort from all stakeholders involved in education, including policymakers, educators, students, parents, and society as a whole.

HUMAN DEVELOPMENT INDEX

The Human Development Index HDI measures the average achievement of a country in three basic dimensions of human development — a long and healthy life, education and a decent standard of living. The Human Development Index is calculated using four indicators — life expectancy at birth, mean years of schooling, expected years of schooling, and the Gross National Income (GNI) per capita.



HDI Rank of India 2023

This score is a remarkable improvement compared to the South Asian region's average value of 0.508 and is close to the world average of 0.465, and India ranks 132 out of 191 countries.

Key points

- India's latest HDI value of 0.633 places the country in the medium human development category, lower than its value of 0.645 in the 2020 report. The report attributes the drop in HDI from 0.645 in 2019 to 0.633 in 2021 to India's falling life expectancy — from 69.7 years to 67.2 years during the survey period.
- India's expected years of schooling stand at 11.9 years, down from 12.2 years in the 2020 report, although the mean year of schooling is up at 6.7 years from 6.5 years in the 2020 report.
- Although India retained its 132nd position in the Gender Development Index, the female life expectancy dropped from 71 years in the 2020 report to 68.8 years in the 2021 report.
- The mean years of schooling for females declined from 12.6 to 11.9 years in the corresponding period.
- India scored 0.123 in the Multi-Dimensional Poverty Index (MPI) with a headcount ratio of 27.9 per cent, with 8.8 per cent population reeling under severe multidimensional poverty. Over the last decade, India has lifted a staggering 271 million out of multidimensional poverty.

HDI rank	Country	HDI Value 2021
1	Switzerland	0.962
2	Norway	0.961
3	Iceland	0.959
4	Hong Kong, China (SAR)	0.952
5	Australia	0.951
6	Denmark	0.948
7	Sweden	0.947
8	Ireland	0.945
9	Germany	0.942
10	Netherlands	0.941
18	United Kingdom	0.929
19	Japan	0.925
21	United States	0.921
79	China	0.768
132	India	0.633

REASONS FOR LOW RANK OF INDIA IN HUMAN DEVELOPMENT INDEX

India's Human Development (HDI) rank has improved in recent years, but it is still relatively low compared to many other countries. Here are some of the reasons why India's HDI rank is low:

- **Poverty:** India is home to a large population of people living in poverty, which is one of the main factors affecting its HDI rank. Poverty affects access to healthcare, education, and other necessities that are crucial for human development.
- **Education:** Although India has made significant strides in increasing literacy rates, there are still large disparities in access to education between different regions and social groups. Lack of access to education limits people's opportunities and hinders their potential for human development.
- **Healthcare:** Access to healthcare is limited in many parts of India, particularly in rural areas. This limits people's ability to lead healthy lives and reach their full potential.
- **Gender inequality:** Despite progress in recent years, gender inequality remains a significant issue in India. Women and girls face discrimination on many areas, including education, healthcare, and employment opportunities.

- **Environmental degradation:** India is one of the countries most affected by environmental degradation, which has a significant impact on people's health and wellbeing. Pollution, deforestation and climate change are all factors that hinder human development in India. Overall, addressing these and other factors that limits human development is crucial for India to improve its HDI rank and ensure a better future for its citizens.

SOLUTIONS TO IMPROVE INDIA'S POSITION IN HUMAN DEVELOPMENT INDEX

Some of the steps which can be instrumental in realizing the dream of India finding a place within the top slots of HDI may be as following:

1. **Investment hurdles:** Overcoming hurdles or limitations in the way of investment in the social sector is of crucial importance. More investment is needed in areas such as education, health, infrastructure etc. Along with this, streamlining traditional approach of generating new sources of revenue generation, steps like rationalized targeting of subsidies, judicious use of revenues meant for social sector development etc. will probably go a long way in meeting the challenges in this regard.
2. **Performance evaluation:** Effective performance evaluation of the projects and activities engaged in the social sector development through innovative methods like outcome budgeting, social auditing of the programs and meaningful participation of community members from the policy-making level to policy evaluation has been known to yield positive results.
3. **Reducing Inequality:** Inequality in different forms - social, economic and political is the key factor affecting the ranking in HDI. India, though, has made enormous efforts to remove all kinds of inequalities but is yet to get desired results. In this regard, rampant corruption in the delivery of services and lack of coordination between agencies has played a major role which needs to be corrected on the urgent basis.
4. **Governance reforms:** Adoption of new managerial techniques along with adherence to the principals of 'Good Governance' will bring about comprehensive reforms thus removing the impediments afflicting the real development of the country.
5. **Innovative solutions:** A greater thrust on research and development essential to chalk out innovative policies and programmes for dealing with new developmental challenges should be the core area of concern for the government as the task of real growth and challenges demand innovative and profound solutions.

CONCLUSION

The research on the role of education in human development suggests that education is a fundamental component of economic growth and social progress. Education is not only important for acquiring knowledge and skills, but it also plays a crucial role in shaping an individual's personality, values and attitudes towards society.

One of the key findings of this research is that education has a positive impact on economic growth and development. Educated individuals tend to earn higher salaries, have greater job opportunities, and are more likely to become entrepreneurs. Additionally, education improves

the overall health and well-being of individuals and communities, leading to better social outcomes.

Furthermore, education is essential in reducing poverty and inequality. By providing education to

Underprivileged individuals and communities, it can help break the cycle of poverty and create a more equitable society.

The research also highlights the importance of quality education in achieving these positive outcomes. Quality education refers to education that is inclusive, equitable, and relevant to the needs of society. It emphasizes the importance of investing in teacher training and support, promoting innovation and creativity, and providing access to resources and technology.

In conclusion, education plays a critical role in human development, contributing to economic growth, social progress, and reducing poverty and inequality. Investing in quality education is crucial to achieving these positive outcomes and creating a better future for all.

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CHAPTER 3

ANALYSIS OF SOCIO-ECONOMIC FACTORS AFFECTING THE GROWTH AND DEVELOPMENT OF THE INDIAN ECONOMY IN COMPARISON TO GLOBAL ECONOMY'S DEVELOPMENT

Rohan Singh

Ms. Poorvi Medatwal

ABSTRACT

The economy and socio-economic policies of any country play an important role in determining its' stand in the world economy and the contribution it makes in the global development. There are various internal factors which create distinctions and varied development rates even within the same country. The research paper focuses on the factors affecting the growth and economic development using different factors and taking them as parameters for growth the research paper also focuses on the most economically developed state and the least developed one and suggests some positive measure that the state can adopt and implement in order to achieve a sustainable economic growth and contribute to the overall Gross domestic product of the nation.

Keywords- *Growth, development, factors affecting growth and development, GDP.*

SIGNIFICANCE OF THE RESEARCH

As it is a well-known fact that with proper socioeconomic policies the development is possible in an efficient manner and also the factors which affect development differ from region to region and nation to nation keeping this in mind we can study various factors affecting the global development by considering and comparing a smaller area of research and applying its' result and possible outcomes to the rest of similar regions ,it is therefore very important to learn a lesson and understand the significance of these factors to analyze them , by not just making it applicable to our surroundings implementing them and eradicating problems faced in global development as a whole. People need to learn to rely on eco-friendly materials for their daily sustenance, So that they can coexist peacefully with nature and ensure a holistic development.

RESEARCH QUESTIONS

- Studying in-depth and analyzing factors affecting growth and development in the Indian economy?
- Analysis of how Mumbai, the financial capital, can set an example for other states and backward nations than India to follow?

- Studying the relationship between socioeconomic policies and global development.

OBJECTIVES OF RESEARCH PAPER

- To develop an understanding about various socio-economic factors involved in indicating growth and development.
- Studying with the help of a comparative analysis about what can the most economically developed city of India preach as an example to be followed for the less or least developed ones.
- Studying how socio-economic policies of a nation affect global development.

RESEARCH METHODOLOGY

The research was conducted using mixed method research combining the qualitative and the quantitative method of researching. The secondary data available to the researcher was used to create the content analysis. Data is gathered at the secondary, state, and national levels through a variety of publications, information, and other sources such as current research on the same topic. To gather information on the subject, a range of internet databases of journals, books, and projects by students and specialists in various professions were used. In the lack of primary data, data was used to solve the study problems and analyze them.

LIMITATIONS OF THE RESEARCH PAPER

It is beyond the scope of the research paper -

- To do a comprehensive study about the world economy.
- Do a comparative analysis of the Indian economy with the world economy.

LITERATURE REVIEW

There has been a lot of work regarding the growth and development of the economy and parameters involved in this with surveys, magazine journals and articles from various sources. Including articles from The Hindu, Indian Express and other newspapers and other figures for a better understanding.

INTRODUCTION TO GROWTH AND DEVELOPMENT

The term "economic growth" implies what exactly?

Economic growth is characterized by an increase in both the quantity and quality of a society's output of economic products and services. Everyone's spending is someone else's income, therefore a society's total income equals the entire value of all commodities and

services it creates.

Growth, however can be both positive or negative and so growth cannot be always associated with development what may be growth for one May be depreciation for another person and what may be development for one may not be the growth for another person economic growth is the growth in the form of monetary terms that can have serious impact on one's health surrounding or other factor in such a case this growth cannot be said to be your positive growth.

What does Socio- economic development entail?

Socio-economic Development refers to the programs, policies, and activities that aim to enhance the economic well-being and quality of life of a community or the society at large. The meaning of "economic development" depends on the community in which you reside. Each community has its own advantages, obstacles, and priorities.

Development always carries a positive connotation along with as development is related to the positive increase in a person's overall developmental state.

A very fine **difference between growth and development** can be explained with the help of an example given below For example construction of a private tobacco factory for manufacturing cigarettes and construction of a private school for educating the children in the nearby surrounding even though both the entities are private and will earn revenue for the people who have constructed it but in the first case as it can be clearly seen that smoking may be injurious for the society and therefore it is not a development for the society while on the other hand, by constructing a school It will educate the children and will help to increase the literacy rate of the area this can be termed as development in the real sense.

FACTORS THAT IMPACT GROWTH AND DEVELOPMENT MAJORLY

1. The Availability of Natural resources

The existence of natural resources is one of the key factors influencing the expansion of an economy is the availability of natural resources.

Natural resources include things like land area, good soil, abundant forests, a strong river system, mineral and oil resources, a good climate, etc.

For economic growth to occur, plentiful natural resources are required. A country without access to natural resources might find it difficult to grow quickly.

Natural resource wealth is a necessary but not sufficient condition for economic development. Natural resources are misused, underutilized, or wasted in developing nations. They are only behind because of this.

Despite not having an abundance of natural resources, nations like Singapore, Japan, and others are among the world's developed countries.

These countries have demonstrated a commitment to minimizing resource waste, managing resources as effectively as possible, and conserving the available resources.

2. Capital Formation or investment supports

It is the process through which a community's savings are channeled into investments in

capital goods such as plant, equipment, and machinery, increasing a country's productive capacity and worker efficiency and ensuring a higher flow of commodities and services.

The process of capital formation indicates that a community does not spend its whole income on products for current consumption, but rather saves a portion of it and invests it in capital goods that greatly expand the nation's productive potential.

3. Literacy rate educational opportunities and policies

Education is a very important tool for the growth and development of an individual and the society as a whole if a person is literate and educated then he can invest knowledge that he is on from education into something meaningful and can contribute into the economic sphere back into the society

4. Technological advancement –up gradation and availability

Primarily, technological growth involves study into the adoption of new and improved manufacturing methods or the enhancement of existing methods.

Due to technological advancement, natural resources are occasionally made accessible. In other words, technical development increases the capacity to utilize natural and other resources more effectively and productively in order to boost output. Using enhanced technology, it is possible to obtain a bigger output from a given collection of resources, or the same output from a smaller set of resources.

The development of technology enhances the capacity to make better use of natural resources; for instance, with the assistance of power-driven farm equipment, agricultural output has improved dramatically. Utilizing superior technology, the United States, United Kingdom, France, Japan, and other advanced industrial nations have increased their industrial might.

Adoption of new industrial techniques encourages economic development.

5. Human resource or human capital formation skill development programmes

The level of economic growth is very dependent on the quality of the population. Given this, it is very crucial to invest in human capital through education, health care, and other social welfare programs.

People's knowledge, skills, and abilities are improved through human resource development, which makes them more productive. Making them aware of entrepreneurship skills means teaching them how to find new investment opportunities and how to be willing to take risks and put money into new enterprises that are growing.

Most of the world's poor countries are not poor because they don't have enough money, infrastructure, unskilled workers, or natural resources. Instead, they are poor because they don't have enough people who are willing to start their own businesses. Because of this, it is very important for developing countries to focus on education, new research, and scientific and technological progress to encourage entrepreneurship.

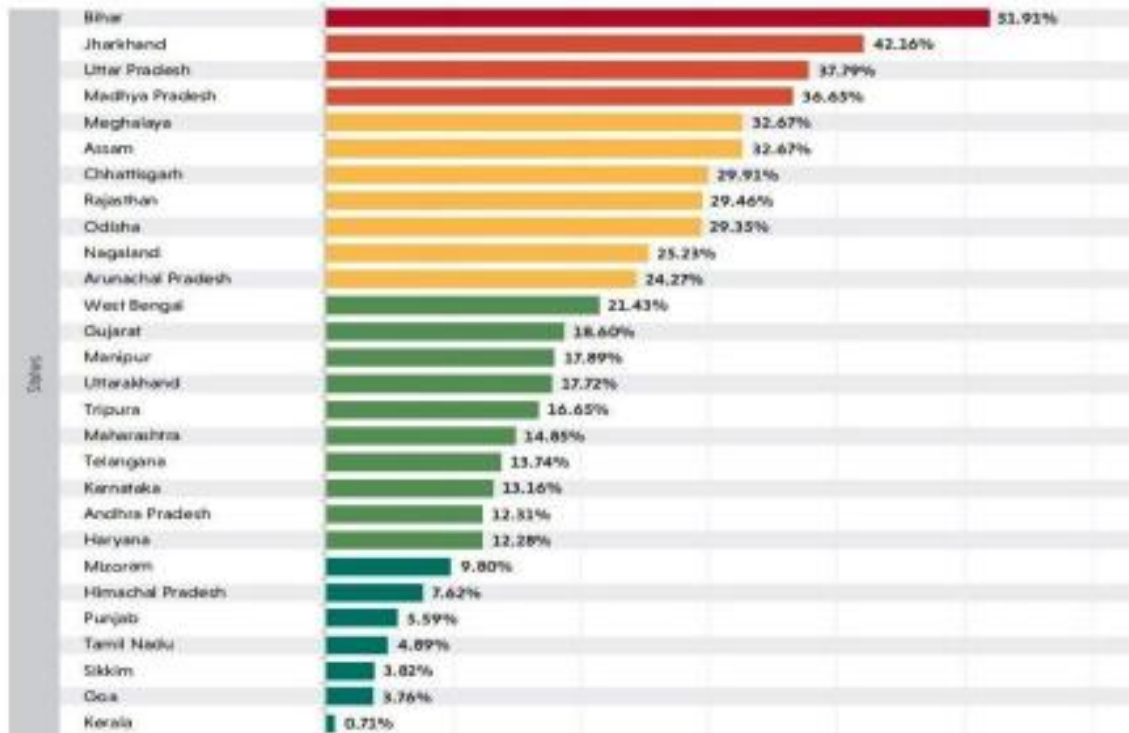
COMPARATIVE ANALYSIS OF THE MOST AND THE LEAST DEVELOPED

Mumbai, the Financial Capital of India, is the **richest city in the country** with a GDP of \$310 billion making Maharashtra the most developed state.

As per multidimensional poverty index 2021 Bihar was recorded as the poorest state amongst all the others making it the least developed one.

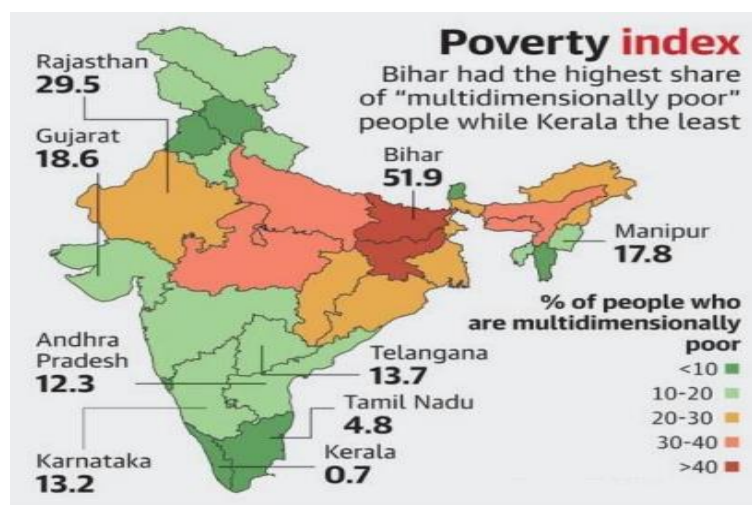
India: Headcount Ratio

Percentage of population who are multidimensionally poor in each State/UT



SOURCE- Bhat, W. (2022, May 22). *10 Poorest states in India in 2022*. Ground Report.

<https://groundreport.in/these-are-the-10-poorest-states-in-india/>



SOURCE-<https://www.thehindu.com/news/national/bihar-has-most-poor-people-in-india-niti-aavog/article 37698673.ece>

Parameters for Comparison	MAHARASHTRA	BIHAR
NATURAL RESOURCES	LESSER THAN BIHAR	HIGH AVAILABILITY
CAPITAL FORMATION	Rs 65,210 crore	Rs 30,788 crore
LITERACY RATE	69.83%.	88.69 %
TECHNOLOGICAL ADV.	Manufacturing, international trade, Mass Media ,aerospace, technology, petroleum, fashion, apparel, and tourism	Food processing, dairy, sugar, manufacturing, and healthcare
HUMAN RESOURCE DEV.	0.697	0.536

ANALYZING THE IMPORTANT FACTORS THAT BIHAR SHOULD CONSIDER

- The comparative analysis of the two stage shows what Bihar need to take down an implement in its own state from Maharashtra starting from the natural resource availability even the availability of the resources is higher in Bihar as compared to Maharashtra the state is not able to occupy and judiciously use the resources as they do not have the proper Technology to extract the resources and put them into use on the other hand Maharashtra do having less resources than Bihar have the technology to extract the resources and put them into the uses.
- The capital formation is only possible through the joint efforts of the people such as the community investment that are later channel for the overall development of the area the money inflow in the state of Bihar is very less as compared to Maharashtra because of the less earnings of the people in Bihar due to lack of the infrastructure and other facilities the state clearly last in capital formation and there is a high variation in the percentages of the two States when the capital formation of both is compared.
- The literacy rate of Bihar as shown in the government of figures entirely different from the ground reality of the state where more than half of the population is illiterate specially the women of the state are mostly uneducated if this population Receive proper educational facilities they can be a human resource and give their valuable inputs in the growth and development of the state overall
- Maharashtra is highly technological advance from Aerospace stations to Having the most robust output boosting mechanism in their industries which makes ate the financial capital of the country the state of Bihar can also take loans and make the state technological advance even though the basic occupations that they have are dairy farming and domestic household oriented With an appropriate Technology they can save their time and energy and there intensive labor resources and put them into alternative uses and at the same time can increase the efficiency of the production and earn overall more profits.

· Human beings are the center of every organization and therefore human resource development is a crucial factor for the growth and development of any state and any country overall. By investing into the human capital in the form of Healthcare education and providing them with other facilities to ensure the well-being the people can definitely prove to be a useful asset to the society, the skill development program in Maharashtra and higher as compared to the state of Bihar and therefore Bihar should also start the skill development program for the overall Welfare of the people residing over there. Having entrepreneurship skills they can contribute the higher percentage in the total GDP of the country and even have an experience of self- Reliance and self- sufficiency among themselves.

LINKING THE SOCIO-ECONOMIC POLICIES OF A NATION AND ANALYZING THE IMPACT OF THE POLICIES AS A WHOLE IN GLOBAL DEVELOPMENT

The social economic policies of a nation and its impact on the global development can be assessed as an interdependent relationship , as according to the trends it can be seen that when a nation possesses good social economic policies and factors which are positively affecting the socio economic conditions such as affordable medical healthcare, ensuring literacy levels, adopting environment friendly technologies and adopting sustainability - acts as the building pillars for a positive type of development globally as along with the social economic status the influence and the impact is positively seen on stability and global security as a whole, whereas when a nation does not possess the economic policies which are aligned with the interests of the community or the society as a whole, the impact gets negative . For a better understanding here is an illustration that can be taken into consideration for example India is known for its medical tourism and affordable healthcare facilities aligning with such social economic policies the people from all over the globe visit India as medical tourists , who after getting the treatment done at an affordable price also contribute into the economic status of India as tourists later on , similarly in a nation like Pakistan where the prime focus is just on saving the drowned economy which keeps on sinking Deeper into the debt traps , a healthy financial security in such a nation cannot be ascertained and therefore there are slim chances of choosing such a nation for trading, the human resource development is just another way of adding into the global development where in the human resources are used to the full potential and capabilities to expand the production and the manufacturing process based on the skill sets and the abilities of an individual to contribute in the community or the society as a whole which fosters the world's economy to rise with benefiting all the people, for example a garment manufacturer chain Hennes and Mauritz Retail Pvt. Ltd outsources its production work and never manufactures the cloth by itself but at the same time keeping the notion of sustainability , uses the old clothes and recycles them again bearing the flame of sustainability and setting an example for The other industries and manufacturing units globally to follow.

Therefore global development in the widest sense means a development which promises or at least tries to fulfill the parameters of basic financial security, eradication of poverty and

global hunger ,fosters environmental sustainability and promotes the idea of a healthy globalization which brings development for all.

CONCLUSION AND FINDINGS OF THE RESEARCH PAPER

Economic growth and development is marked by the blend of production and creative innovation brought about by utilizing capital and human resources. Through the research paper we understood that what growth and development exactly means and how can it be achieved by keeping some important factors that determine the growth and development in mind it further shows improvement in the overall contribution to develop in area and the country's economy as a whole the skill to learn here is that no matter how Limited the natural resources are the extraction of the same should be learn and the judicious use of the available resources should be made to overcome the problem of limitation and locational disadvantage as faced by many, the capital formation is a one- time investment that adds on a numerous times into the economic development and the continued growth of the economy, the education and the literacy should never be hampered as it is by those literate people who further go on becoming human resource and give their contribution for the same a person who does not possess any materialistic resources but possessive the intellectual resources can still be of great significance to the society and give his valuable input in the GDP growth. The technological advancement reduces the labor work and effort and does the work more efficiently and quickly than manual labor as the time changes so does the technology and the methodology of doing a work people must be mindful about this fact and for the same reason the technology should remain upgraded and updated to meet the day-to-day requirements of the contemporary society so that the technological barrier does not act as a hindrance to the growth of the people and the economy of the nation. The research paper overall talks about the introduction of two major states of the country and what is their input In the growth and development, it further analyzes and compares the Two States and provides for fruitful recommendations to be adopted and implemented for fostering and promoting the development in a Holistic manner. It also gives a brief idea about how socio-economic development positively impacts global development and establishes an interdependent relationship between them.

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CHAPTER 4

Digital transformation in the Indian banking system

Bhumika Saini

ABSTRACT

The term "digital banking system" is hitting the headlines in the newspapers since India beat China with 25.5 billion digital payment transactions in 2020. Digitalization in the banking sector aims at improving the user experience. None of the sectors has seen the same digitalization transformation as what the Indian banking system is seeing today. India currently has 350 million digital payment users, with that figure expected to double by 2030. In this study, we will be able to conclude how the Indian banking system is transitioning to digital transformation. The main purpose of this research is to comprehend the growth in the Indian banking system due to digitalization and also see what the changing landscape of the Indian banking system looks like. The story of the banking revolution starts with the introduction of RTGS, NEFT, and IMPS. In this research paper, you can understand where we were and where we are today. UPI and BHIM can be seen as pioneers of the digital revolution in India. A year after UPI was launched; the overall number of payments was 6%, compared to 36% for card payments. In FY 2021, however, UPI's share climbed to 63%, while card payments declined to 9%. One cannot imagine the Indian economy aching digital payments because prior to 2016, people resisted making digital payments and believed that India would not adopt digital payments. The importance of researching this topic is to know how digitisation in Indian banking is impacting the economy, and we can also see what the future holds for India. Digitalization of the Indian banking system brings revolutionary changes to the economy. As every coin has two sides, so does the digital banking system, which poses some risks of cyber fraud and a low literacy level in India. There are so many efforts shown by the government of India to help people adopt digital banking systems by educating them and ensuring maximum access to these facilities. In India, we are going to see RBI regulations on Neobanks and Fintech companies change in the near future. Initiative and innovations in India's banking sector make this industry's future quite promising. According to a Deloitte report, India will have 1 billion smartphone users by 2026, with rural provinces driving the sale of smartphones. This will undoubtedly increase the footprint of Fintech and accelerate the digitalization of the Indian banking system. The outcomes of this research are not only that we can understand where the government has been putting its efforts in the banking system, but what are the scope and opportunities that digitalization can bring for the Indian banking sector to achieve growth?

Keywords

Indian Banking System, Digitalisation in Banking, Banking revolution, RBI Initiatives, Digital Transformation

Introduction

Digitalization is defined as a transformation process in which existing processes can be converted into digital technologies. For instance, the manufacturing sector is the second-most impacted sector that underwent digital transformation after the Indian Banking System as technologies like AI, block chain, cloud computing, and many more have emerged. The term "digitalization" in the Indian banking system refers to the shift from a cash-dominated economy to a digital payment economy. In other words, the adoption of technology in banking systems like Paytm, PhonePe, and Google Pay is called "digitalization" of the banking system.

There was a time prior to RTGS, NEFT, IMPS, and UPI when you had to visit the bank to transfer cash from one place to another. There was no track once you transferred the money. However, all of these issues have been resolved, and we are now in the phase of digitalization where banking services are available 24 hours a day, seven days a week.

The golden handshake between fintech and NBFC has brought a lot of changes and can bring more because of the highest adoption rate of fintech in India, which is 87%. Accessibility and settlement of transactions were identified as the problems from which India was suffering and becoming a roadblock in the growth of our country. We will further see in this research paper how the Indian banking system addressed these problems and made the way clear for our economy to follow the path of growth. Let's delve deeper to know the journey of the Indian banking system, which has come a long way.

Transition Period: Journey of Indian Banking System

Electronic payment systems have dominated the retail payment space with an estimated 61% share in terms of volume and 75% share in terms of value during the FY 2019–20 due to the introduction of innovative electronic payment systems that leverage technology that can be used through the internet and mobile devices³.

The usage of mobile and internet-based payment systems to complete payments for the purchase of goods and services has significantly increased in the country as a result of increased mobile and internet penetration. The adoption of mobile-based payments all around the country has been made easier by the introduction of simple acceptance infrastructure (QR codes).

In this research paper, we have divided the growth journey of the Indian banking system into different phases.

1.1 1984 - 1994

- The Dr. Rangarajan Committee proposed computerization of banking activities at various levels in its recommendations from the years 1984 and 1989.

- A committee on "Technology Upgrading in the Payment Systems" was subsequently established in 1994, and it made recommendations for the establishment of an information technology institute for research and development as well as consultancy in the use of technology in the nation's banking and financial sector.
- In order to lead technology adoption in the banking and financial sector, IDRBT was established on June 10, 1996 as a Society under the Society Registration Act.
- The IDRBT's attempts to make sure that the Indian Banking and Financial Sector uses the greatest technology to deliver convenient banking services included the four technology services described above. Given the importance of the services provided by the Institute for the continued growth of techno-banking in the nation, there was a need to pay them more attention.

Table 1.1⁴

Sl. No.	Technology Service	Date of Launch
1.	Indian Financial Network (INFINET)	June 19, 1999
2.	Structured Financial Messaging System (SFMS)	December 14, 2001
3.	National Financial Switch (NFS)	August 27, 2004
4.	Indian Banking Community Cloud (IBCC)	August 02, 2013

Source: RBI data base

1.2 2001-2005

- In order to guarantee clearing and settlement for transactions in the currency, government securities, foreign exchange, and derivative markets, CCIL was established in April 2001. Moreover, CCIL offers non-guaranteed settlements for cross-currency forex transactions and rupee interest rate derivatives (through CLS Bank).
- On March 26, 2004, the Real Time Gross Settlement (RTGS) system of the Reserve Bank of India became operational. It was initially accessible for the interbank settlement of transactions. As of April 29, 2004, the RTGS system is now available for the settlement of customer transactions⁵.

⁴ These services served as the foundation for the adoption of information technology in the Indian banking and financial sectors. The Institute's services were crucial for the country's continued development of techno-banking.

⁵ Kotecha, 2019

RTGS is a technology that enables real-time gross settlement transfers from any bank account in India to any other bank account holder during business hours. There is no maximum amount that may be sent via RTGS; however, it can vary between banks. The minimum amount is 2 lacs.

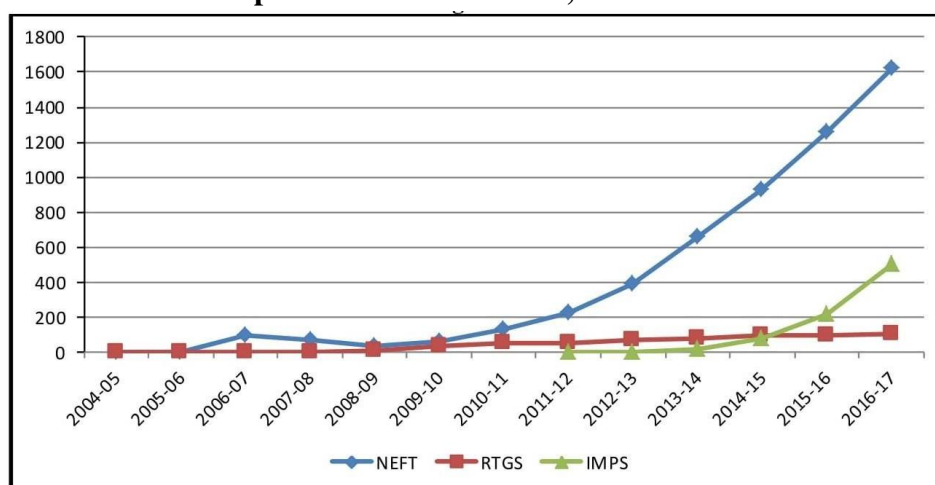
Table: 1 Growth of RTGS

Year	Volume(Million)	Value (Billion)
2011-2012	55	5,39,307.50
2012-2013	68.5	6,76,841.00
2013-2014	81.1	7,34,252.40
2014-2015	92.8	7,54,032.40
2015-2016	98.4	8,24,578.00
2016-2017	107.8	9,81,904.00

Source: RBI reports from 2011 to 2017

Analysis: Since its inception, the reach and utilisation of RTGS have increased steadily. Customer remittance transactions increased from 55 million to 98.4 million from 2011-2012 to 2016-2017. This demonstrates the growing popularity of RTGS in the Indian banking industry in the following ways.

Graph: 1 Growth in NEFT, RTGS and IMPS



Source: RBI data base

- In addition to RTGS, the Reserve Bank of India also introduced the NEFT system in 2005. As of right now, there are 87 banks participating in NEFT and 96 in RTGS. These two electronic funds transfer systems are used by more than 49,000 bank branches⁶.

Table: 2 Growth in NEFT

Year	Volume(million)	Value (Billion)
2011-2012	226.1	17,903.50

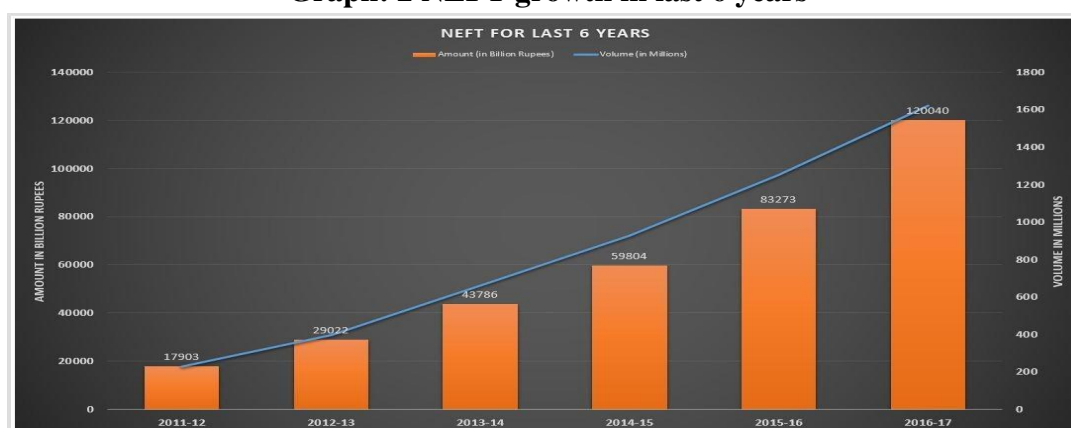
⁶ Kotecha, 2019

2012-2013	394.1	29,022.40
2013-2014	661	43,785.50
2014-2015	927.6	59,803.80
2015-2016	1252.9	83,273.00
2016-2017	1622.1	1,20,040.00

Source: RBI reports from 2011 to 2017

Analysis: Customer remittance-related transactions climbed from 226.1 million to 1622.1 million between the years 2011–2012 and 2016–2017. This demonstrates how widely used NEFT is in the Indian banking sector.

Graph: 2 NEFT growth in last 6 years



Sources: RBI Data base

1.3 2005-2010

NPCI was established as an umbrella organization for the retail payments system in India under the direction and cooperation of the RBI and the Indian Banks' Association (IBA). With the intention of operating for the benefit of all member banks and their customers, creating infrastructure for operating pan-India systems with high availability and scalability to process growing volumes of retail electronic payments, etc., it was founded in December 2008 as a Section 25 company (not-for-profit company) under the Companies Act, 1956 (now Section 8 of the Companies Act, 2013).

On September 24, 2010, the RBI developed the idea of a panel for resolution of disputes (PRD) to address disputes quickly and timely between member banks. As Core Banking Systems (CBS) were implemented in banks, Speed Clearing was introduced in 2008 for the local clearance of out-of-state checks issued on CBS-enabled bank branches, greatly reducing the turnaround time for clearing out-of-state checks⁷.

⁷ RBI/2010-11/213

DPSS.CO.CHD.No.654/ 03.01.03 / 2010-2011

1.4 Why did the Indian banking system feel the need to bring in new innovations in the digital banking system?

- The biggest shortcoming of RTGS is that customers can't keep track of their transactions. Only the remitting bank gets confirmation from the central bank.
- NEFT and RTGS cannot be used for urgent fund transfers. Adding beneficiaries is way too lengthy a process.
- RTGS is designed to transfer an amount greater than Rs 2 lakh. NEFT was brought in to make the transfer of payment, which is less than 2 lakhs, but it took 30 minutes to settle the same.
- There were service charges that the user had to pay for using the services of RTGS and NEFT.
- There was no direct payment method, which makes instant payment possible and allows a direct transaction to take place between the merchant and purchaser.

1.5 Introducing IMPS and UPI: - (2010-2016)

1.5.1 IMPS- Immediate payment service (2010)

Interbank Mobile Payment Service (IMPS), also known as immediate payment service, is a term used to describe electronic money transfers made possible by mobile phone services. Due to the fact that clients transfer money using their mobile phones, IMPS is a mobile-based payment service.

IMPS went public on November 22, 2010. The IMPS service is currently used by

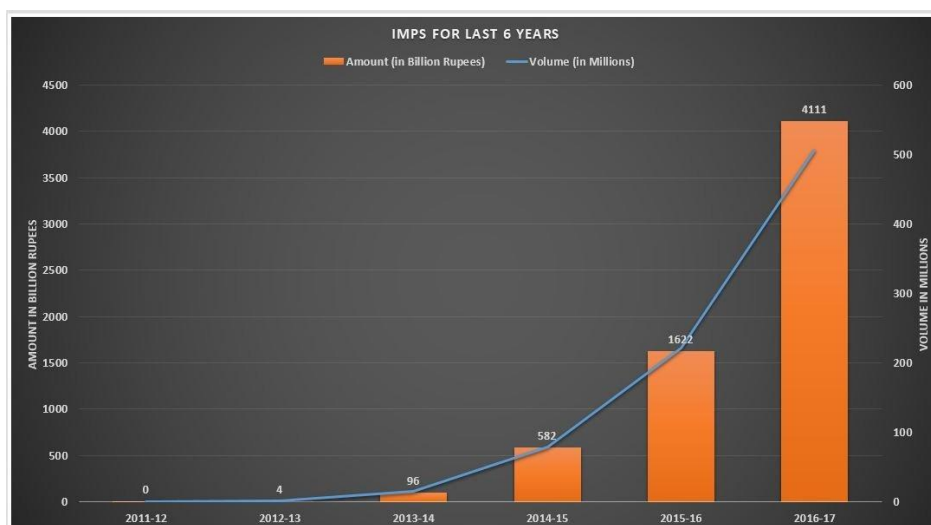
- 53 commercial banks
- 101 rural/district/urban and cooperative banks
- 24 PPI signed up
- Every month, around 200 million IMPS transactions totaling approximately US\$20 billion take place in India.

The features offered through IMPS are listed below:-

- **Instant Money Transfer:** As the name implies, fund transfers via IMPS are simple and instant. The service provides secure inter-bank fund transfers by using mobile phones as a route for accessing bank accounts.
- **IMPS is available** 24 hours a day, 365 days a year, allowing users to transfer funds at any time and from any location. You do not need to travel to the bank and go through a complicated process to make payments to your clients or transfer monies.
- **IMPS charges** are mostly determined by the amount being transferred as well as the bank's policies. Regular IMPS charges, on the other hand, run from Rs. 2.50 to Rs. 25 for sums ranging from Rs. 10,000 to Rs. 5 lakh⁸.

⁸ www.paisabazaar.com/banking/how-to-use-imps/, 2023

Graph: 3 IMPS Growth



Source: RBI reports from 2011 to 2017

Analysis: Since its inception, the reach and utilization of IMPS has grown at a rapid pace. Transactions surged from 0.1 million to 506.7 million from 2011-2012 to 2016-2017, as seen in the graph below, demonstrating the tremendous popularity of IMPS in the Indian banking industry.

Table 3: Growth of IMPS

Year	Volume(Millions)	Value (Billions)
2011-2012	0.1	0.4
2012-2013	1.2	4.3
2013-2014	15.4	95.80
2014-2015	78.4	581.90
2015-2016	220.8	1,622
2016-2017	506.7	4116

Source: RBI reports from 2011 to 2017

The system's initial requirement that the beneficiary and sender both register for mobile banking was restricting growth. As a result, the system was modified to allow money transfers using other criteria such as account numbers, IFSCs (like NEFT), or Aadhaar numbers associated with bank accounts.

Table 2.1⁹

⁹ NEFT- National Electronic Fund Transfer
IMPS- Immediate Payment Service
RTGS- Real Time Gross Settlement

NEFT vs IMPS vs RTGS			
Particulars	NEFT	IMPS	RTGS
Settlement	Happens in batches. Settlements occur every 30 minutes	Real-time and instantaneous	Real-time and instantaneous
Transaction limits	Minimum: Rs 1 Maximum: No limit. However, individual banks may set their own limits for each transaction and the amount transacted per day	Minimum: Rs 1 Maximum: Rs 2 lakh per transaction	Minimum: Rs 2 lakh Maximum: No limit
Charges involved	Nil for online transactions. A fee may be charged for NEFT done via bank's branch	As per bank	Nil for online transactions. A fee may be charged if done via bank's branch
When to use	Transferring small amounts, especially to settle accounts between family and friends	For making urgent payments. For example, if a family member buys something and doesn't have money to pay the shopkeeper	For making instant transfers of high-value amounts. For example: paying a vendor who supplies goods for your business

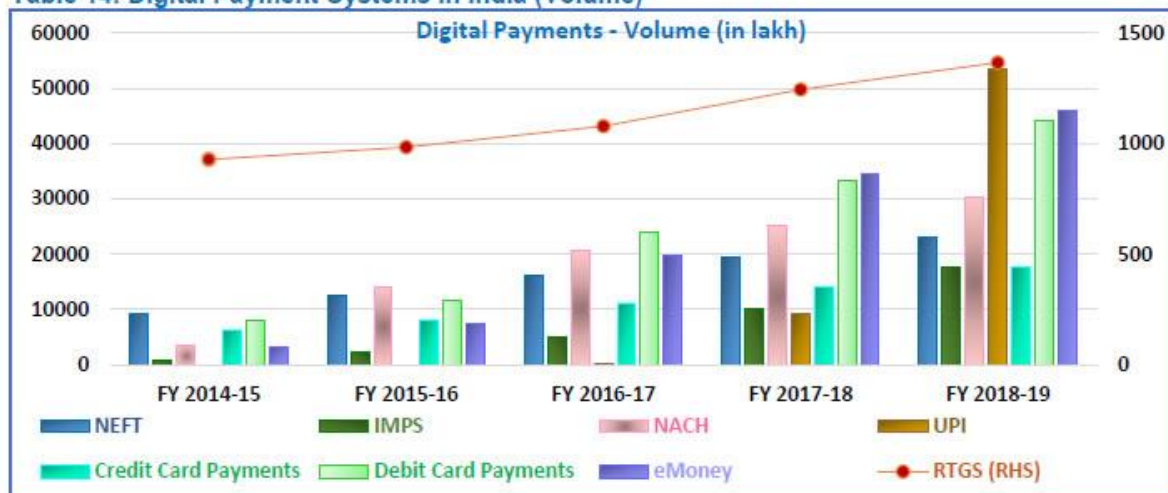
1.5.2 UPI- Unified Payment Interface (11 April, 2016)

- Users of UPI can send and receive money instantly using a virtual payment address (VPA) that is provided by the user themselves. UPI is a mobile-based "fast payment" system that operates around the clock.
- The secure part of UPI architecture, which eliminates the need to disclose account or bank details to the remitter, is what makes VPA-based transactions special.
- It allows P2P and P2M payments and may be utilised on smart phones (app-based), feature phones (USSD-based), as well as at the merchant location (app-based).
- Via pull-and-push payments, merchant payments, utility bill payments via QR code (scan-and-pay), etc., UPI enables instant money transmission.
- UPI can also be used for non-financial activities like mobile banking registration, balance inquiries, etc. It allows any participating bank or non-bank Third Party Application Provider to integrate several bank accounts into a single mobile application (TPAP).
- BigTech companies also participate in UPI as third-party application providers, facilitating transactions via their platforms such as Google Pay, Amazon Pay, WhatsApp, and others. Non-bank PPI issuers also offer the UPI facility to their PPI wallet holders in an interoperable manner¹⁰.

¹⁰ Refer to Appendix A

- On December 31, 2016, Prime Minister Narendra Modi introduced the BHIM-UPI App at the start of the "DigiDhan Mela" in order to improve and popularise the interface even further.

Table 14: Digital Payment Systems in India (Volume)

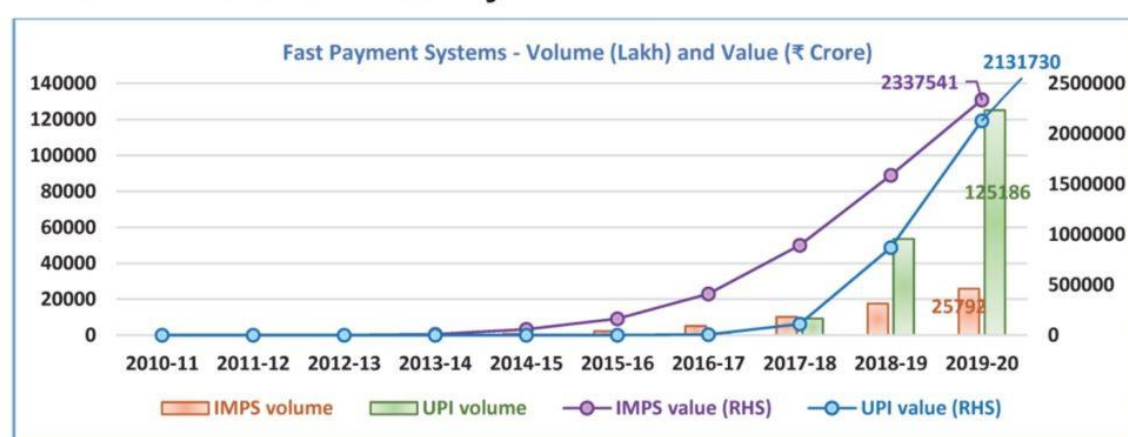


Source: RBI Data

11

UPI has made significant progress towards firmly setting India on the path to a cashless economy and making digital payments a habit. With 346 banks operating live on the UPI interface in August 2022 alone, 6.58 billion financial transactions worth over Rs. 10.73 lakh crores were completed.

Table 11: Growth of Fast Payments



Source: RBI Data

12

¹¹ Refer to Appendix B

¹² Refer to Appendix B

1.6 Estimates of cash payments and currency in circulation

Measurements of the amount of cash payments in the economy have been made in certain surveys and reports. Although many of the statistics are simply estimates, they do give some indication of the use of currency and the level of digitalization in the nation and globally. These estimations indicate that not only in India but also in many other countries, cash still holds sway.

The "cash share of the wallet," calculated as the amount of cash withdrawn in a country as a share of its annual GDP, was used in the Pymnts Global Cash Index for Asia Pacific, published in June 2018, to assess the popularity of physical cash exchange in comparison to that of alternative payment methods. India was shown to be very reliant on money.

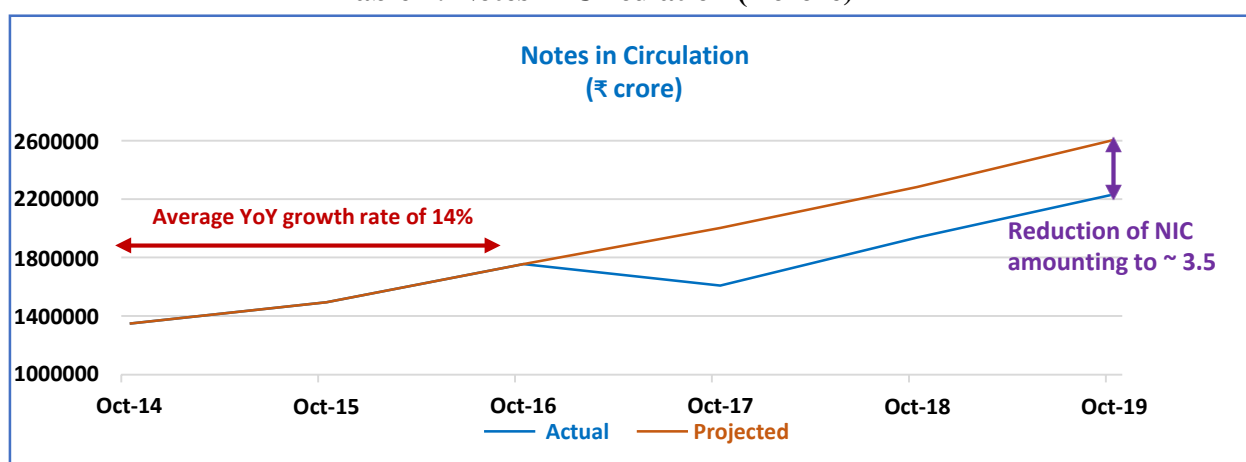
Table 7: Cash Propensity and Growth in Cash

Country	Population (mn)	GDP (USD bn)	Cash Propensity (%)	Total Cash Growth (%)
Australia	24.4	1282.0	11.2	-0.7
China	1382.7	10365.4	35.9	9.2
India	1299.8	2939.5	49.3	10.5
Japan	127.0	5049.4	3.4	-8.5
Korea	51.2	1458.9	4.1	2.1
Singapore	5.6	276.3	16.7	1.6

Source: Pymnts Global Cash Index for Asia Pacific published in June 2018

Analysis: The amount of CIC is tied to the usage of cash as a payment instrument because one of the key forces driving currency demand is its use for payment. Throughout the last five years, between fiscal years (FY) 2014–15 and 2018–19, the CIC expanded at a compound annual growth rate (CAGR) of 10.2% across the country.

Table 2: Notes in Circulation (₹ crore)



Source: RBI Data

Between October 2014 and October 2016, the number of notes in circulation (CIC minus coins in circulation) rose at an average pace of 14%. Given the same growth rate, the number of notes

in circulation (NIC) in October 2019 would have been 26, 04,953 crore. NIC, on the other hand, was 22.31.090 crore, demonstrating that digitisation and cash reduction helped lower NIC by over 3.5 lakh crore.

2 Some Recent Innovations and Initiatives (2017-2023)

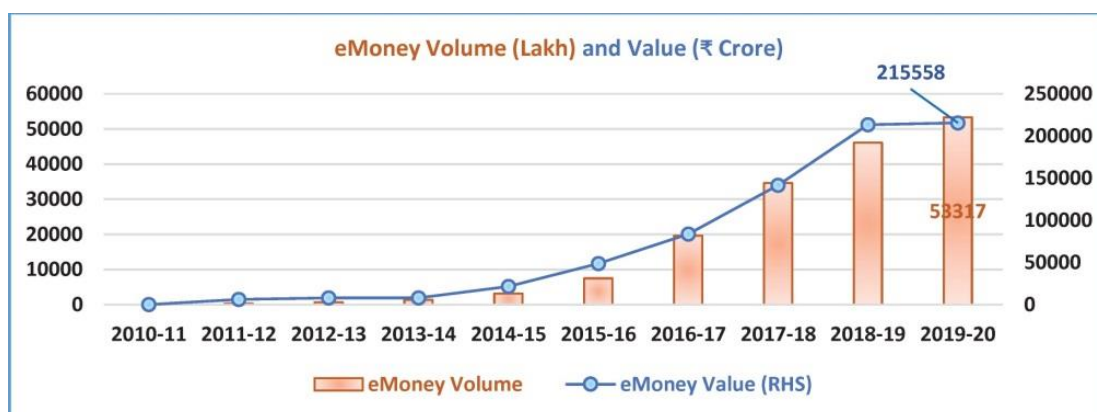


Table 12: Growth of e-Money

Source: RBI Data

Analysis: Due to the switchover to electronic payment methods brought about by the November 2016 demonetisation, e-Money experienced a 162.5% year-over-year growth in 2016. The low-value daily transactions switched to e-Money, whereas medium- to large-value transactions are still done through digital banking channels and checks. The pattern persisted in the following years, with volume increasing by 76%, 33%, and 15% in FYs 2017–18, 2018–19, and 2019–20, respectively, indicating a noticeable change in favour of e-money.

2.1 (1) UPI123Pay (2022)¹³

Smart phones currently offer efficient access to UPI. The short code *99# can be used to access UPI via NUUP (National Unified USSD Platform). UPI123pay would significantly expand the choices for these people to utilise UPI, especially in light of the fact that there are more than 40 crore feature phone mobile subscribers in the nation. UPI123Pay offers the following four options:

(a) App-based Functionality: A feature phone would be equipped with an app that would enable various UPI functionalities that are available on smartphones to be made available on feature phones as well.

(b) Missed Call: By making a missed call to the number shown at the merchant outlet, feature phone users will be able to access their bank accounts and carry out ordinary tasks, including receiving, transferring funds, making regular purchases, paying bills, etc. **(c) Interactive Voice Response (IVR):** In order to begin conducting financial transactions without the usage of an internet connection, users would need to place a secured call from their feature phones to a

¹³ RBI, 2022

Press Release: 2021-2022/1830

predefined number and complete the necessary UPI on-boarding procedures.

(d) Proximity Sound-based Payments: This technology makes contactless, offline, and proximity data communication possible on any device. It does this by using sound waves.

2.2 (2) DigiSaathi (2022)¹⁴

The "DigiSaathi" 24x7 Helpline offers a way to get assistance with all types of digital payments. The website www.digisaathi.info, chatbots, and a toll-free number all offer automated responses on information on digital payment products and services in Hindi and English.

Another option is a short code (14431). Via its website, chatbot, and toll-free phone numbers, DigiSaathi will help users with their questions about digital payments. Users can ring or call out the specific options or items for which information is needed. In the future, more interactive features and linguistic possibilities will be available.

2.3 (3) e-Rupee (2022)

The digital rupee-retail (e-R) retail segment experiment was introduced on December 1, 2022, to a closed user group (CUG) of participating customers and merchants. The e-R exists as a digital token that stands in for money. It is being distributed in the same denominations as coins and paper money. Banks, who act as financial intermediaries, are responsible for its distribution. With a digital wallet provided by the collaborating banks, users will be able to conduct transactions via e-R. Transactions between people (P2P) and businesses (P2M) are both possible. The e-R offers characteristics of actual money, such as trust, safety, and finality of settlement.

The central bank issues electronic tokens rather than producing paper money or striking coins. The value of this token is guaranteed by the government's complete trust and credit. As a result, online transactions will be safer and risk-free, the digital economy will grow, and the creation of a worldwide digital payment system will be made simpler.

3 Results Driven From Survey

A two-day survey was conducted to determine the level of satisfaction with digitisation in the banking sector, as well as how the banking industry's transition to digital technology has helped individuals by making things more convenient for them. This survey provides firsthand information regarding users' attitudes towards Internet banking.

Number of Participants- 20

Date- 4th and 5th March, 2023

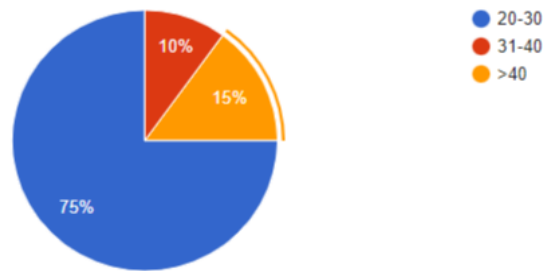
3.1 Demographic Details

¹⁴ RBI, 2022

Press Release: 2021-2022/1830

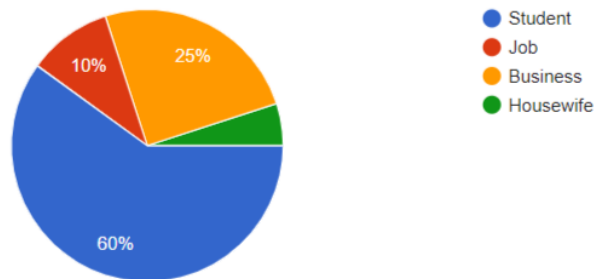
2) Age

20 responses



3) Occupation

20 responses



Analysis:

Just 10% of participants are between the ages of 30 and 40, whereas 75% are between the ages of 20 and 30. Persons over the age of 40 account for 15% of the population.

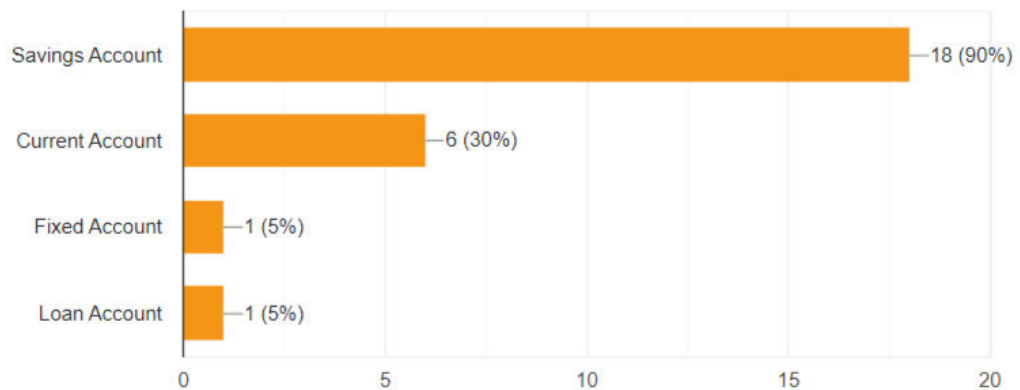
The survey included 12 students, 2 from the service sector, 5 entrepreneurs, and 1 housewife. This demonstrates the diversity of people who took part in our poll and shared their banking experiences.

3.2 Banking Details and Their Experience

4) Which type of bank account do you have?

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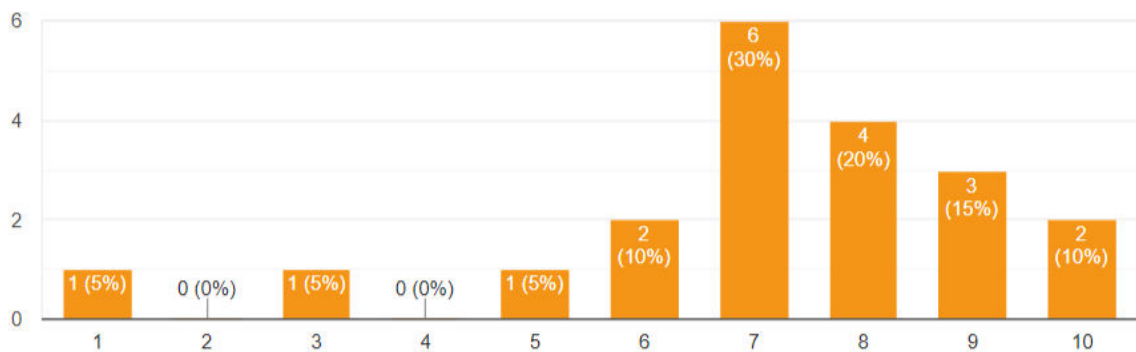
20 responses



5) Rate your Internet banking experience

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20 responses



Analysis: -

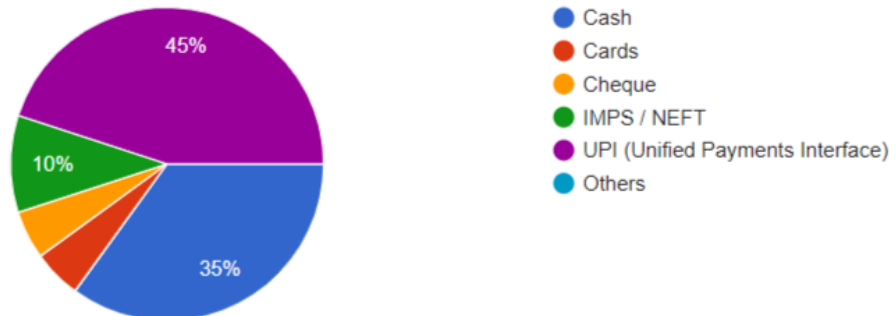
This section of our poll asks how many accounts a person has and what kind of accounts they have. We discovered that 18 participants have savings accounts, 6 have current accounts, 1 has a fixed account, and 1 has a loan account. We can see here that saving interest and safety are both motivating reasons for consumers to open savings accounts. On a nationwide scale, more than 46.25 crore people have benefited from PMJDY. When we asked customers to rank their banking experience, the findings were fairly apparent. Because of certain issues with our digital banking system, the majority of customers rated it as a 6.

3.3 Payment Methods

6) Which payment method do you use most frequently?



20 responses



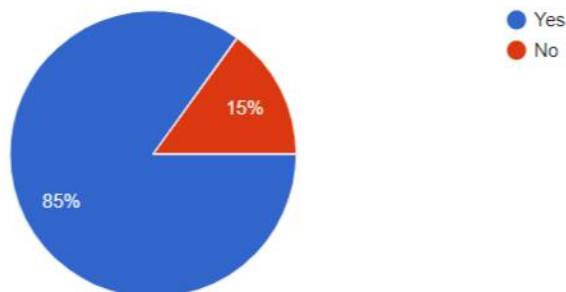
Analysis:-

It was clear that most people preferred to use UPI as a payment option due to its convenience. They do not need to add any beneficiaries and can make payments in a matter of seconds.

3.4 Perspective towards Internet Banking

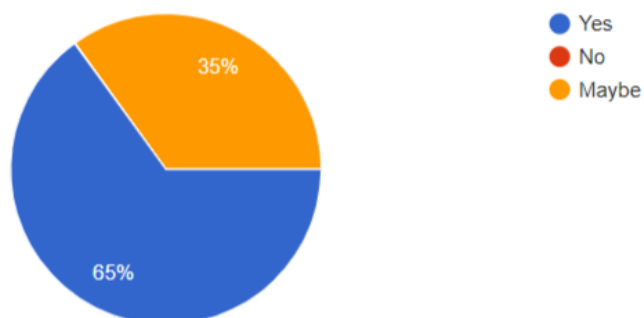
7) Do you believe that using internet banking can help you save time and money?

20 responses



8) Do you think E-Banking is secure and safe ?

20 responses



Analysis:-

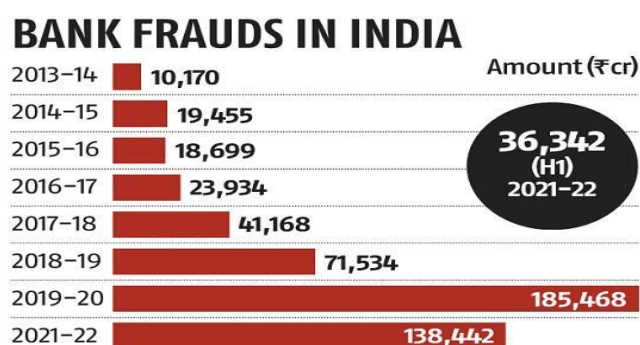
Internet banking is useful to 85% of consumers in terms of saving time and money. When it comes to the safety and security of Internet banking, 65% believe it is safe, while 35% are concerned about the security of Internet banking due to an increase in the number of cybercrimes. Building user trust is essential in Internet banking. The government and the RBI prepared plans and initiatives to carry out in order to acquire the trust of all users.

4 Two Sides of Digital Banking System

4.1 1) Challenges

1. **Cyberfraud** concerns have increased dramatically as digitization has increased. You may have recently heard about billions of dollars being plundered from the world's top banking institutions. Online wrongdoings are characterised as follows:
 - **Hacking** is defined as unauthorised access to a system in order to deteriorate or view misguided information.
 - **Phishing** is a method of collecting confidential information such as a username, password, one-time password, and so on.
 - **Vishing**: A criminal conduct for social engineering via phone to access an individual's and a population's financial data with the objective of gaining monetary benefits.
 - **Spamming**: spontaneous communications broadcast to a large population in an attempt to limit the message to persons who may not receive it.
 - **ATM Skimming and a Special Deal Wrongdoings**: It is the most advanced means of trading off an ATM machine or POS by installing a device on the keypad that replicates the same thing.

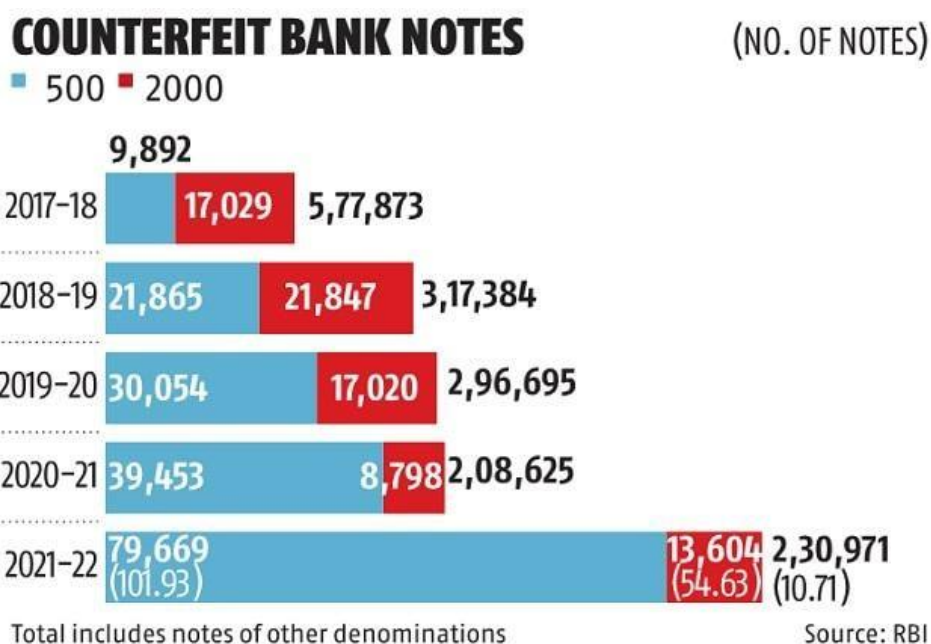
Table 3.1¹⁵



- 1.1 ¹⁵ Commercial banks reported Rs 1.38 trillion of frauds in 2020-21, as compared to Rs 1.85 trillion in the previous year.

Source: Business Standard

- A. **Ransomware is still a major threat:** Given its great digital ambitions, India continues to be a target for international hackers. According to CERT-In, ransomware assaults increased 51% in the first half of this year, 2022. With the relatively easy availability of ransomware as service kits that allow even less-trained hackers to carry out operations, ransomware will continue to pose a significant danger to Indian banks and financial services organisations in 2023.
- B. **Lack of Awareness:** 80% of frauds are committed due to a lack of awareness. Many people do this when dining out, giving their debit card and PIN to the waiter when paying. Giving away PINs so simply exposes individuals to fraud. "Their personal information is stolen if there is a concealed skimmer in the swipe machine," said Sai Krishna, chairperson of the Global Cyber Security Forum and a city-based cyber security specialist.
- C. **Data breaches:** These are expected to become more common. The Indian government informed the parliament in August 2022 that Indian banks reported 248 successful data breaches by cybercriminals between June 2018 and March 2022. The majority of data breaches were related to card details leaking and the theft of company and non-business information.
- D. **Circulation of fake currency:** After dropping in 2020–21, counterfeit notes increased by 10.7% in 2021–22, with Rs 500-denominated false notes increasing by 102%. The circulation of fake Indian currency notes (FICN) in the country remains a concern, even after the 2016 demonetisation, one of the principal aims of which was to eliminate note counterfeiting.

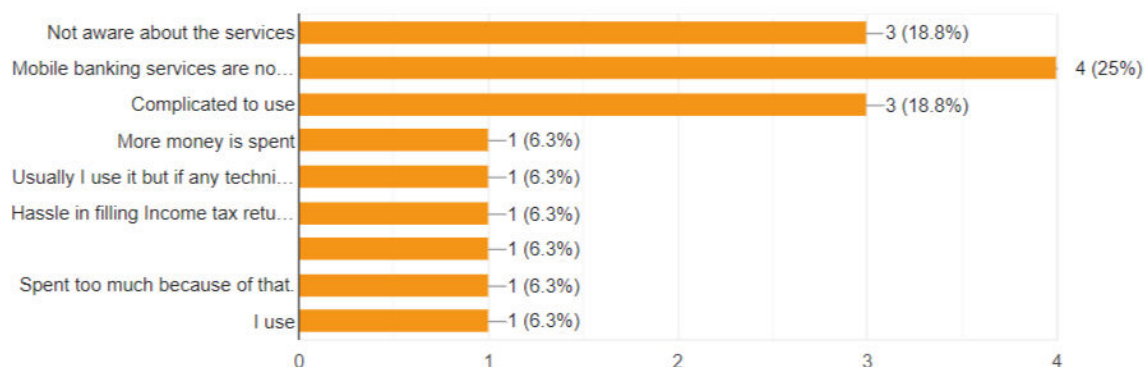


Graph 1.1¹⁶

10) Reasons for not using Internet Banking?

 Copy

16 responses



4.2 2) Opportunities and Achievements

4.2.1 Opportunities

- A. By 2020, the number of internet users is predicted to reach 120 billion, with 70% of urban customers already using digital banking services.
- B. With 1 billion+ Aadhaar Cards, 150 million e-KYC, and 40+ banks with UPI or AEPS, the Government of India has established an open API architecture as the backbone for digital innovation in financial services. Digital innovation will also enable the creation of infrastructure for recent technologies such as Bitcoin and block chain technology.
- C. Untapped Rural Markets: India's untapped banking sector market accounts for 70% of the entire population, providing a large opportunity for the growth of e-banking in India. All urban areas have financial services, but only a few large villages have banks. Because a big majority of Indians still live in rural regions, e-banking must broaden its geographical reach to include all villages.

4.2.2 Achievements¹⁷

The Payments Vision 2021 aimed to provide every Indian with safe, secure, accessible, rapid, and economical e-payment options, and it established four goalposts of Competition, Cost, Convenience, and Confidence, with 36 specific action objectives and expected outcomes.

These objectives have been met by the following initiatives:

The establishment of a regulatory sandbox, the opening of Centralised Payment Systems (CPS) to non-bank PSOs, the facilitation of small value digital payments in offline mode, 'on tap' authorisation for payment systems, the internationalisation of domestic payment systems, feature phone-based payment services, a framework for self-regulatory organisation for payment systems, and other initiatives (Competition).

¹⁶ Other reasons identified from the survey

¹⁷ RBI, 2019

1. **Waiver of RBI charges** for transactions processed in the Real Time Gross Settlement (RTGS) and National Electronic Funds Transfer (NEFT) systems, waiver of charges for savings bank account customers for online NEFT transactions, review of ATM interchange fee and customer charges, implementation of Payments Infrastructure Development Fund (PIDF) Scheme, increased use of Legal Entity Identifier (LEI) for large value cross-border and d (Cost).
2. **Availability of NEFT, RTGS, and National Automated Clearing House (NACH)** 24x7x365, standardisation of Turn-Around-Time (TAT) for transaction resolution and compensation, e-mandates for recurring transactions using cards / PPIs / UPI.
3. **The JAM (Jan Dhan, Aadhar, and Mobile) trinity**, which is a merger of sovereign initiatives in the shape of Jan Dhan and Aadhaar, as well as low-cost mobile and data, have been critical enablers for the country's rapid growth and steep trajectory of digital payments.
4. This has also led to **tremendous expansion in the Aadhaar-enabled Payment System (AePS)** via the Business Correspondent aided approach for facilitating digital payments via micro-ATMs. With approximately 114 crore mobile users (TRAI, February 2022), of which approximately 84 crore (Statista, 2021) have smart phones, the increase in mobile phone consumer base has facilitated digital.
5. Overall **digital payments climbed by 216%** in terms of volume and 10% in terms of value in March 2022 when compared to March 2019. The usage of debit cards for payments rather than cash withdrawals, online transactions competing favourably with offline (or card present) transactions, and small or big value transactions being handled digitally have all affected the client experience.

Because of the contactless nature of digital modes offered by modern technologies and legislative flexibility, crores of Indians have the option of practising social distancing when making payments. UPI alone shows a more than 1200% increase over the same period.

5 Future of Indian Banking System

As we have discussed the above challenges facing the Indian banking system, let us now see what steps are being taken by the government to eliminate these challenges.

- A. **Launched E-currency-** Nine banks have been chosen to participate in the wholesale digital rupee pilot project. State Bank of India, Bank of Baroda, Union Bank of India, HDFC Bank, ICICI Bank, Kotak Mahindra Bank, YES Bank, IDFC First Bank, and HSBC are among them. Yet, as financial inclusion increases through the e-Rupee, India should see a higher embrace of a cashless payment ecosystem. A cashless economy means the convenience of digital transactions and the elimination of the danger of carrying and keeping currency.
- B. **Accessibility-** Prime Minister Narendra Modi used video conferencing on Sunday to dedicate 75 Digital Banking Units (DBUs) to the nation. People will be able to use the brick-and-mortar DBU outlets to open savings accounts, balance-check, print passbooks, transfer funds, invest in fixed deposits, loan applications, stop-payment instructions for cheques issued, apply for credit / debit cards, view statement of account,

pay taxes, pay bills, and make nominations, among other things.

- C. **Financial Education-** They will promote Digital Financial Literacy, with a focus on customer education on cyber security knowledge and precautions," according to the release.
- D. **Spreading Awareness-** The RBI and the government are making significant efforts to raise awareness through celebrities and well-known personalities. To a considerable extent, public awareness of the banking system aids in the reduction of fraud and cybercrime. CICI Bank, the country's second largest private lender, has increased its support for seminars and workshops organised by the country's law enforcement organisations.
- E. **Upgrading NEFT-** The RBI intends to make real-time payments possible using NEFT. There will be improvements in the future to make this system more efficient and effective. Not just in NEFT, but also in other financial systems, there will be numerous updates in the near future to improve user experience while performing transactions.

With an adaptable attitude, a concerted effort from the government, and the RBI's vigilant eye, innovation in digital banking will open up new avenues for client involvement.

6 Conclusion

The digital transformation of the Indian banking system can be seen in the adoption rate of digital payments and the shift towards a digital economy from a cash-dominated economy. From this research, we can conclude that since 2001, the RBI has put so many efforts into directing our country towards the adoption of a digital banking system. Things are now more transparent than before and much more convenient. We have seen how financial services have revolutionized. A survey conducted during this research helped get users insights on the digitalisation of the Indian banking system. Every system has to face some challenges, so bringing digitalisation to the Indian banking system also brings some challenges, but where there are challenges, solutions are also there to eliminate those challenges. RBI and the government identified the problems that prevailed due to the digital transformation of the Indian banking system. Every year, a target is set to eliminate these problems and make digital payment methods more effective and efficient. According to Deloitte research released on Tuesday, India will have 1 billion smartphone users by 2026, with rural areas driving the sale of internet-enabled phones. This means more people will use digital payment services in the upcoming years in India.

7 Appendix A

7.1 Fintech as a Facilitator of Digital Transformation in the Indian Banking System

Over the last two years, India has been more welcoming to FinTech businesses and has encouraged widespread adoption of digital financial models. Banks have traditionally functioned as the entryway to payment services in India. However, the gradual adoption of FinTech businesses such as Paytm, Razorpay, Google Pay, Amazon Pay, PhonePe, MobiKwik,

and others has led to their ubiquity today.

Over 32 billion digital transactions worth over Rs 69 trillion were done in India in 2019 Indian digital transactions are anticipated to exceed Rs 238 trillion by 2025. Such large figures demonstrate how the emergence of FinTech businesses has simplified and facilitated banking services.

Because 40 percent of the population is still unbanked and 87 percent of payments are conducted in cash, India has a big untapped opportunity for financial service technology businesses. With mobile usage anticipated to rise to 64% in 2018 from 53% today, and internet penetration continuously increasing, the potential for FinTech growth in India cannot be emphasized. Furthermore, according to some estimates, up to 90% of small enterprises are not connected to established financial institutions.

Table A

S.No	Area of Financial Inclusion	Use of FinTech
1	Increase the government's social cash transfer to enhance the poor's personal disposable income. It would set the economy on a moderate path of sustained inclusiveness.	Easy cash transfer app
2	Banks should make special efforts to increase account opening for females from low-income families under this social cash transfer plan as a welfare measure (Sukanya Shiksha Scheme).	Modification to existing Bank FinTech App.
3	To improve credit system stability and access, Aadhaar should be linked to each individual credit account as a unique biometric identity that may be shared with credit information bureaus.	Integration of Aadhaar Infrastructure
4	To improve 'last mile' service delivery, banks' traditional business model should be altered to rely more on mobile technologies.	Enhanced Mobile Banking
5	Expand formal credit availability to all agrarian segments through an Aadhaar-linked process for Credit Eligibility Certificates (CEC).	Digitisation of land records
6	Corporates should be encouraged to support Self Help Groups (SHGs) as part of their Corporations Social Responsibility (CSR) efforts.	Loan / Payment App
7	The government is introducing a universal crop insurance policy that would cover all crops beginning with small and marginal farmers and will have a monetary limit of Rs. 2 lakhs.	Crop Insurance App
8	UID should be implemented for all MSME borrowers, and data from it should be shared with credit bureaus.	UID for MSME App
9	Credit guarantees in specialist areas for micro and small businesses (MSEs). It would also look into counter-guarantee and re-insurance options.	Multiple Guarantee App for agencies

8 Appendix B

8.1 Analysis of Table 14 and Table 11

- Retail electronic payments, which include credit transfers NEFT, quick payments (IMPS and UPI), and direct debits (ECS, NACH), have grown rapidly in terms of volume and value, with a CAGR of 65% and 42%, respectively.
- Stored value cash issued in the form of wallets and prepaid cards saw substantial usage, with a volume and value CAGR of 96% and 78%, respectively.
- In terms of volume and value, debt and credit card payments grew at a CAGR of 44% and 40%, respectively.
- Card payment usage has been aided by developments such as contactless payments and tokenization technology, which have contributed to growth. Also, the use of cards for payment is growing in comparison to their use for cash withdrawal.

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CHAPTER 5

IMPORTANCE OF VR TECHNOLOGY IN EDUCATION IN INDIA: A CRITICAL REVIEW

Shreya Sharma

Dr Arpita Banerjee

ABSTRACT:-

Virtual reality (VR) is a cutting-edge technology that, by giving students immersive and interactive experiences, has the potential to revolutionize many facets of education in India. The user feels completely engrossed in the environment because it is a computer-generated one with realistic-looking items and situations. A virtual reality headset, helmet, or other equipment is used to view this environment. Extraordinary content repository has been developed after thorough in-depth research conducted for years. The VR-based content offers a three-dimensional computer-generated environment that is specially designed keeping in mind the neuroscientific perspective of a child's brain functionality. Such content offers a 360- degree understanding of the topic and ensures a long-lasting impact on the mind which makes retention easier and understanding better. This repository is a set of experientials, personalized content created with required pedagogical inputs and are highly interactive for better receptivity. Various VR methods provides an holistic growth and improvement in the study patterns of the students leading them to the path of productive human beings, hence should be made part of today's Education System This research paper aims to explore the current state of VR Technology in Education in India, including its benefits and challenges. It also examines the various applications of VR in different areas of education and provides recommendations for its integration into the Indian education system.

Keywords: 3D, VR Technology, Education System, India as a whole

INTRODUCTION:-

Through the use of a VR headset or other gadgets, people can engage with a virtual environment that can be real or imagined. However, Jaron Lanier, the founder of VPL Research, started to build the equipment, including goggles and gloves, needed to experience what he dubbed "virtual reality" in the middle of the 1980s, which is when the phrase "virtual reality" was first used. It provides a unique and immersive experience that can be used to enhance learning outcomes by making education more engaging, interactive, and effective.

Through the use of virtual reality (VR), students can traverse the globe without ever leaving the classroom. Think about letting folks visit the Taj Mahal while they are working at their desks. The use of virtual reality in education makes this possible. Most people have heard of the word virtual reality (VR), but many do not completely comprehend it or are not aware of its implications in learning and education.

VR describes interactive media (videos or images) that allow the spectator to fully explore a scene in all directions. Most people have heard of the word virtual reality (VR), but many do

not completely comprehend it or are not aware of its implications in learning and education. Virtual reality (VR) is the term used to describe interactive media (videos or images) that let the viewer fully explore a scene in all directions.

In this paper, we will explore the various applications of VR in education in India, its benefits and challenges, and the potential for its integration into the Indian education system.

Applications of Virtual Reality in Education:-

- **Improve student involvement:** The conventional reading and learning theory approaches may not be interesting to all kids, but a virtual reality setup is thorough and engaging, enabling students to learn by observing, responding to, and participating in what they are learning. Kids can examine 3-dimensional pictures, and it can be made more cutting-edge and interesting technologically by merging other technologies like the internet of things in schooling.
- **Experience-Based Education:** Learning something by reading or writing about it, constructing it around an imagined past or future, imagining things and speculating on how they could feel, and actually experiencing it as it has actually appeared are all quite different things. Virtual reality allows for the latter. This encourages experience-based learning by giving students with engaging displays that give them the impression that they are a part of the environment they are witnessing. By combining the devices with sensors that enable the learner's movements to be tracked and the displays on the VR screen to change in response, this experience can be further enhanced.
- **Virtual Field Trips:** Field trips are a crucial component of educational culture and they frequently give students exposure and real-world experience. Virtual reality is a great method to experience travel and tours without really visiting to the location while saving money and time. Users can turn their heads to see the area from various perspectives and angles while viewing the location's realistic graphic-based sights and vistas as if they were there in person. Inside the classrooms, all of this is possible.
- **High Tech Training:** Virtual reality can be utilized to deliver high-tech-based, qualified training while informing individuals about the tactical elements of execution. For the registered individuals to practice for the real-time situation, they construct a realistic-looking environment. They employ a virtual reality environment along with potential real-world tools connected by a wireless network that appear to move in the training VR screen much like they do in real life.

Benefits of Virtual Reality in Education:-

- **Increasing Student Involvement:** Through virtual reality, students may actively engage in the class and experience learning. By exploring immersive learning environments like visiting the moon or travelling to far-off places, teachers can boost interest and engagement in the classroom while igniting students' imaginations.
- **Boosting Knowledge Retention:** Virtual reality learning immerses students completely in the subject matter being studied in class. Student's brains produce clear, thorough mental maps of topics when they experience them as real-world situations, which can increase knowledge retention by up to 75%.

- **Improving Student Learning Outcomes:** Experiential learning in virtual reality improves a number of student outcomes. By giving kids engaging, individualised experiences like caressing a pulsing human heart or wandering beside prehistoric dinosaurs, teachers can increase test scores by up to 20%.
- **Developing Collaboration and Social Skills:** Virtual reality improves social and teamwork skills by designing motivating, team-based learning environments. Students can engage and work together in the educational metaverse as they explore various learning themes in pairs and groups.
- **Building Empathy:** Teachers can genuinely put their students in other people's shoes via virtual reality. By aiding students in experiencing life from a variety of viewpoints, such as learning about different cultures or living as a refugee, teachers can help students develop emotional awareness and empathy.
- **Supporting SEND Learning:** By expanding accessibility and bringing up new possibilities, virtual reality helps special education. From immersive sensory rooms to essential life skills, teachers can create individualized learning environments that are in line with the different learning contexts of their students and meet their specific needs.

Challenges of Virtual Reality in Education:-

- **Cost:** The cost of VR equipment can be prohibitive for many schools and students in India.
- **Accessibility:** VR requires high-speed internet and powerful computing devices, which may not be available in many parts of India.
- **Content Creation:** The creation of high-quality and engaging VR content requires specialized skills and expertise.
- **Teacher Training:** Teachers require specialized training to effectively integrate VR into their teaching methodologies.

Integration into the Indian Education System:-

- **Infrastructure Development:** The Indian government can invest in infrastructure development to provide high-speed internet and computing devices to schools and students across the country.
- **Content Creation:** The government can provide funding and support to educational institutions to create high-quality and engaging VR content.
- **Teacher Training:** The government can provide training and professional development opportunities to teachers to effectively integrate VR into their teaching methodologies.

LITERATURE REVIEW:-

Virtual Reality (VR) has gained significant attention in education in recent years due to its potential to enhance learning outcomes. A study conducted by Singh et al. (2021) found that VR technology can significantly improve students' understanding of complex concepts in science and mathematics. Another study by Jayakumar et al. (2019) demonstrated the effectiveness of VR in improving students' retention of knowledge and motivation to learn.

In India, several initiatives have been launched to integrate technology into the education system, including VR. The National Education Policy 2020 emphasizes the use of technology to provide personalized and interactive learning experiences to students. The government has also launched several programs such as the Digital India program and the Samagra Shiksha Abhiyan to provide digital infrastructure and resources to schools and students.

METHODOLOGY:-

This research paper is based on a qualitative research methodology that involves a review of relevant literature on Virtual Reality in education in India. The research has been conducted by searching various academic databases such as Google Scholar, Scopus, and JSTOR. The sources used in this research include academic articles, books, and reports on the topic.

CONCLUSION:-

Virtual Reality has the potential to transform education in India by providing immersive and interactive learning experiences to students. Its applications in Improve student involvement, experience - based education, virtual field trips and high tech training can enhance learning outcomes and improve retention of knowledge. However, the integration of VR into the Indian education system poses several challenges such as cost, accessibility, content creation, and teacher training. To overcome these challenges, the Indian government can invest in infrastructure development, provide funding and support for content creation, and provide training opportunities for teachers. The integration of Virtual Reality into the Indian education system can provide students with personalized and engaging learning experiences, ultimately improving their academic performance and preparing them for the future.

FUTURE OF VR TECHNOLOGY:-

Applications that go beyond entertainment, tourism, and marketing are now in high demand, and they must also be more user-friendly and economical. We are therefore likely to encounter expanded reality in hitherto unimaginable ways.

As a result of anticipated technology advancements, VR and AV will be quicker, lighter, and cheaper. Future smartphones with better cameras and processors, 5G networks, and other advancements will also enable us to take advantage of considerably more advanced immersive experiences anywhere.

Some of the major developments that will affect how immersive technologies grow in the future include:-

- LiDAR and its more believable smart phone applications.
- Devices for virtual and augmented reality will be more compact, lighter, and equipped with more functionality.
- Robotic boots and other new items will become available to enhance the experience.
- Chips for AR/VR will be in high demand.
- As full-body haptic suits, it will advance beyond haptic gloves.
- Extended reality will be used for education, training, and medical procedures.
- Thanks to 5G and WebVR, you won't need to download any apps.
- Immersive sporting events.

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CHAPTER 6

THE MARGINS OF MAYCOMB: TO KILL A MOCKINGBIRD

Shreya Garg

Dr Atiqa Kelsy

ABSTRACT

‘To Kill a Mockingbird’, “A novel of strong contemporary national significance” as called by The Chicago Sunday Tribune, had been widely and justly praised as a great American novel. On one level, it is a tender family narrative, on another a poignant depiction of the slow and painful emergence of the New South from the ashes of its slaveholding past. Isn’t it ethically and morally wrong to not give a person the proper education about equality and justice?

Without proper moral education, one will not have the courage to stand up for what’s right. Innocence will quickly be destroyed by social inequalities. Social classes will then collapse, and society may experience a repeat of time of oppression and injustice. “To educate a person in mind and not in morals is to educate a menace to society” as said by Theodore Roosevelt rightly depicts what ‘To Kill a Mockingbird’ by Harper Lee demonstrates.

The principal-agent in the family and this metamorphosis of the South is Atticus Finch, revered both as a model lawyer and an exemplary parent. Those in legal circles hold up Atticus as the quintessential lawyer, the lawyer unafraid to confront his community with its prejudices. Without disagreement, it is reasonable and accurate to say Atticus had a huge moral impact on society throughout the novel, especially during the Tom Robinson trial’s main event. He wasn’t afraid to back down from anything if it was the right thing to do.

The paper will explore how ‘To Kill a Mockingbird’ represents the change in people and society in reaction to certain events. Scout and Jem knew it was morally wrong but couldn’t do anything about it, but with the help of Atticus and his moral way of thinking, he helped his children and citizens of Maycomb to realize the importance that moral education has on society and on people’s lives.

Keywords: Race, blacks, morality, education, marginalized

INTRODUCTION

“Mockingbirds don’t do one thing but make music for us to enjoy. They don’t eat up people’s garden, don’t nest in corncribs they don’t do one thing but sing their hearts out for us. That’s why it’s a sin To Kill a Mockingbird”

The summer of 1960 was made memorable by the release of a novel titled To Kill a Mockingbird. It ranked up a record sale in the hardcover and softcover and it was a gentle compassionate work that became a great motion picture. Miss lee with her very first novel became one of America’s leading novelists, winning a Pulitzer Prize in 1961. It is one of the greatest southern gothic novels but also one of the great American bildungsroman.

Gothic literature can be defined as writing that employs dark and picturesque scenery, startling and melodramatic narrative devices, and an overall atmosphere of exoticism, mystery, fear, and dread. At the start of the novel, Boo is a reclusive monster; Jem, Scout, and Dill are his potential victims; and Atticus is a heroic knight. Later, ignorance, racism, violence, and the marginalized proved to be the novel's real 'monsters.' Tom and Mayella are their victims, and Atticus remains the hero.

Set in the backdrop of Alabama in the 30s when racial discrimination was breathed by the people, Atticus Finch rather provides a refreshing take. His placid and even-tempered nature is reflected as soon as the book starts. Monetary benefits don't matter to him as much as helping others because he accepts the labor done by one of his clients as a mode of payment. He also has more of a logical inclination which was expressed in his version of explanation as to why it was a sin to kill a Mockingbird.

Narrated by precocious Jean Louise "Scout" Finch, who ages from six to eight in the novel, *To Kill a Mockingbird* depicts the initiation of Scout, her older brother Jem, and their friend Dill into the adult world of prejudice and injustice. Growing up in Maycomb, Alabama, in the 1930s, the three children are fascinated by the story of Arthur "Boo" Radley, who, following some youthful misdeed, has been forced into seclusion by his fanatically religious family and subsequently victimized by the community's prejudice and fear. Although the children view him as a monster to be feared, they simultaneously desire to know and understand him. Meanwhile, their lives are disrupted by the appointment of Scout's father, Atticus Finch, as the defense attorney for an African-American man, Tom Robinson, who was accused of raping a white woman, Mayella Ewell. The children's introduction to racial prejudice and injustice is swift and severe. Although Finch proves that Robinson is innocent, the all-white jury finds him guilty, and Robinson is subsequently killed in an escape attempt. Mayella's father, Bob Ewell, revealed in the trial to be a liar, seeks revenge on Atticus Finch and, in a drunken rage, tries to murder Scout and Jem. Boo Radley, who had befriended the children in secret, rescues them. The novel ends with Atticus's fear that society will pay for its injustice but also with the belief that despite his losing the case, a small step has been made toward racial justice.

Throughout this novel, we see that the characters are divided into certain distinct groups, and while some groups are well represented in society, others are marginalised (i.e., they have no social standing in society). One way that the marginalized characters have had a big impact on this story is by changing the views of Maycomb citizens about racial inequality.

LITERATURE REVIEW

"Shoot all the bluejays you want, if you can hit'em, but remember it's a sin to kill a mockingbird"

A very popular modern classic by Harper Lee, *To Kill a Mockingbird* narrates a coming-of-age story with a theme of social inequality and prejudice. The themes include racist southern culture which is deeply rooted in violence and prejudice. As many of us know, the message of this 1960 novel is relevant in the present society.

Harper Lee shows us that in every society there are some people who would stay firmly at the side of justice, though they may face severe consequences. Racial Inequality is a strong force in Maycomb. The novel gives a strong message to the readers. It presents the vulnerability of a minority community and how they fall prey to prejudice. The author very skilfully brings forth the subject of racism, that too very tenderly through characters who peacefully struggle against this evil.

The twists and turns in the lives of siblings Scout and Jem, their upbringing, typical childhood days, etc. Are all very interesting. The most interesting aspect of this novel is that the whole story is narrated by a child. But an eight-year-old child's perspective of the themes of the novel in any way. This 1960 novel is ahead of its time; carrying a message that is still needed by today's world. Harper Lee's debut novel is regarded as one of the best contemporary classics. When townspeople discovered that Atticus is taking on Tom Robinson's defense, children mocked Scout and Jem at school, armed with words they have overheard from their parents' conversations. Scout hears what her neighbours really think about the African-American residents of Maycomb during a ladies' luncheon that Aunt Alexandra hosts at the Finch residence. Mrs. Merriweather uses racist, derogatory terms to refer to African-Americans and a in a condescending tone. She does not see or pretends not to see that Tom Robinson's conviction could have been upsetting to his family and friends and symbolic of a larger problem of racial injustice.

In Harper Lee's *To Kill a Mockingbird*, many social groups are marginalized due to gender, race, and class injustices that were prevalent during the 1930s in the southern states.

A Morality Tale for Modern America

One could expect a book that dispatches moral illustrations to dull read. Be that as it may, *To Kill a Mockingbird* is no sermon. The examples are introduced in an apparently easy style, meanwhile handling the intricacy of race issues with surprising clearness and a solid feeling of the real world. As the Finches get back from Robinson's preliminary, Miss Maudie says: "as I waited thought, Atticus Finch won't win, he can't win, yet he's the main man in these parts who can keep a jury out so lengthy for a situation like that." Regardless of the awfulness of Robinson's conviction, Atticus prevails with regards to causing the residents to consider and battle with their bias.

The examples Lee sets out are epitomized in episodes that are however amusing as they seem to be not kidding, similar to Aesop's Fables. A valid example is when the kids get back from the school show with Scout, actually wearing her stunning ham ensemble. In obscurity they are pursued and gone after by Bob Ewell the dad of the lady whom Robinson purportedly assaulted. Ewell, outfitted with a blade, endeavours to wound Scout, yet the unclear wire enclosure of her ham ensemble makes her free off of equilibrium and the blade to wander off-track. In the battle that results in somebody pulling Ewell off the wavering assemblage of Scout and Jem, he falls on the blade. It was Boo Radley who saved her.

Moving further, Scout and Jem are surprised when their bespectacled, bookish father ends up having a "God given ability" with a rifle; he discharges the single fire that will deliver the townsfolk safe. The youngsters celebrate at what they think about an amazing showcase of boldness. Notwithstanding, he lets them know that what he did was not genuinely valiant. The better illustration of mental fortitude, he tells them, is Mrs Dubose (the "actually imply" old woman who lived not too far off), who figured out how to fix herself of a morphine fixation even as she was biting the dust a horrendously agonizing demise from disease. He likewise shows them the significance of behaving in a civilised way, in any event. Most of the time Atticus trains the youngsters the significance of standing by listening to one's heart in any event, when every other person has opposite perspective: "The one thing that doesn't abide by majority rule", he says, "is a person's conscience."

The proceeding with esteem in Atticus' faith in the significance of principled reasoning in the realm of Black Lives Matter and the Australian government's manner of speaking of "African gangs", is clear. Since the Civil rights Movement of the 1960s, many people believe that racism was abolished by the efforts of Martin Luther King Jr. Unfortunately, studies shows that racism is indeed still prevalent in today's society. Researchers say that there is a kind of racism that is practised every day, that may not seem as obvious as it should, that is referred to as benevolent racism. Some examples include, what people know as "white privilege", colour blindness and ignoring policies that are established in order to prevent the act of racism.

History proves that racism has been an issue within the realm of social justice for many years now, including court cases regarding gun control laws, stop and frisk, and free floating. Black people have faced many racial injustices throughout history and although there are evolving social changes in society, somehow in certain areas racism is accepted.

The Point of View of the Novel is Against Racial Prejudice

Harper Lee's *To Kill a Mockingbird* attempts to discuss racial bias from certain points. The writer wanted to show the readers that racial bias can be met all over the place and most of the times in public activity. All individuals in the public eye, even on the planet can be a survivor of the racial bias. Presumably we become entertainer of racial bias in the public eye intentionally or not, in any event. Lee makes sense of the peculiarity of racial bias which occurred in Southern America, Alabama in Depression time. She involves Maycomb County as the setting of her novel, where Racial injustice portrayed having severe guidelines in the public arena. Individuals in that spot cannot acknowledge different thing outside theirs, and racial bias grows up completely in the public arena, whether against somebody in their gathering or against Blacks.

There are many glasses to watch one scholarly work. The specialists can break down this masterpiece according to many perspectives. To examine a scholarly work from inside designs, they can utilize glasses like structuralism or formalism. Then again, brain research of writing, new historicism, and human science of writing are guides to break down the outer example of abstract works, and there are as yet many glasses that can be utilized to check the writing out. However, in this review, the scientist will have to worry about humanism of writing to dissect the state of individuals who became the casualties of racial bias from others through Harper

Lee's *To Kill a Mockingbird*. Racial bias that occurred in the 1930s can be viewed in the novel as it existed during the Great Depression in the Maycomb society.

In the novel, bias is the significant topic which is done straight by the Whites in Maycomb towards a Black man named Tom Robinson. Harper Lee is a humanist and dark essayist. She utilizes a contemporary person and social issues to depict or to pass on the message of her book. She utilizes fascinating blend of characters to point out that race has hardly anything to do with the manner in which an individual decides to act toward others, and prejudice is drilled by numerous sorts of individuals. Throughout American history, white Americans have generally enjoyed legally or socially sanctioned privileges and rights which have been denied to members of various ethnic or minority groups at various times. Racism against various ethnic or minority groups has existed in the United States since the early colonial era. Before 1865, most African Americans were enslaved and even afterwards, they have faced severe restrictions on their political, social, and economic freedoms. They have suffered genocide, forced removals, massacres, discrimination and injustice. Marginalisation is the relegation of a social group to the edge of society denying them the right to participate wholly in society. These groups are deemed to be unimportant with little value to society. In Harper Lee's *To Kill a Mockingbird* due to gender, race and class injustices that were prevalent during the 1930s in southern states. The examination of the role of women, the ostracism of the lower socio-economic class and the injustice against African-American in Maycomb, Alabama in the 1930s will prove that these social groups are marginalized in *To Kill a Mockingbird*.

A large portion of the Whites acknowledge the authorization of racial bias in Maycomb; however, others decline it. For instance, when they were in the court every white person got to sit on the first floor (where it was cooler) while everyone of colour had to sit higher up. Individuals appointed authorities or juries to support this bad form among the two races. There are numerous clarifications of predilection. One is utilized in double-dealing. The predominant gathering can keep away from sensations of compassion and sympathy for the overwhelmed through generalizations or over embellishments of negatives characteristics.

The Whites generally constructed their own outlook, their own conviction and their own racial bias toward the Blacks. Racial bias is essentially silly since it relies upon the abstract and gloomy inclination about ethnic or gathering. The case of negative assessment of a gathering is the Whites' racial bias toward Blacks. Taking a glimpse at the different bias models, it tends to be reasoned that we are biased against individuals, when we accept that they have specific awful attributes. These suspicions foster when we don't have direct contact with them or we fear them because of them being a minority and unique in comparison to us.

The white individuals generally believe that they are unrivalled and the African-American individuals or the Blacks are mediocre all the time. The Whites can't regard the Blacks. Blacks, in White's viewpoint are the inferior individuals; Whites schools do not concede dark affirmation, Blacks can't be involved in public position like lead representative, sheriff, and the preferences. To some, prejudice is a lifestyle, and to other people, a shocking term. Bigotry comes from various social qualities, ethnic foundations, as well as the actual appearances. The

contention of bigotry happens when the greater part of gathering of society feels that the various societies and upsides of the minority bunch carry the change to the general public.

Atticus Finch (White), a country legal advisor in Maycomb, faces the challenge by safeguarding Tom Robinson (Black). Atticus had to pay a lot for this. It was a disgrace for Whites to guard Blacks. The case makes Atticus named as "nigger-darling" by his general public. He comprehended that he dealt with troublesome issue, since he could guard somebody who was detested by white individuals. The responses of Atticus shows that he upholds common liberties, the majority of the Blacks are different or have declined the act of racial bias in Maycomb. This case reinforced white individuals' perspective that people of colour were miscreant in the public arena. They imagine that individuals of colour were not more than junk in their general public, and whoever needed to guard them, it implied they were additionally the Blacks disregarding Whites. Along these lines, for this situation Scout and her family checked huge issue, since Atticus needed to be Tom's attorney.

That made Atticus and his family getting threats and isolation from practically all individuals in their circumstance, as they had coexisted with Whites' foe. Since the racial bias frequently happened in the public eye, Atticus as a solitary parent attempted to teach his youngsters in his own specific manner. He attempted to keep away from his kids from the sickness of Maycomb County, racial bias being one among many other. He needed his youngsters comprehend whether life isn't just about highly contrasting, however dark likewise shows up in this life. Atticus Finch simply needed to show his kids that they never truly got an individual until they thought about things according to his perspective, until they moved into his skin and strolled around in it. In the event that the readers see Atticus Finch's qualities, they will comprehend Harper Lee purposes Atticus Finch as a still person rationale, astute, and positive reasoning among individuals who couldn't care less about equity any longer.

However, there are a few justifications for why Atticus protects Tom Robinson. Atticus has values and convictions for which he will battle, regardless the conditions. He is the ethical compass of Maycomb. Whenever Tom's case came to preliminary, racial pressures clearly detonate in the town. The adjudicator picks Atticus for the case, maybe realizing that it would be the main way for Tom to try and have a shot at a fair preliminary.

Atticus puts stock in common freedoms. He accepts everybody has an option to a fair preliminary and is a skilful guard. Although Atticus realizes he will lose, he is not entirely set in stone to show the town that Tom is a person with equivalent freedoms. His message pervades the general public: towards the finish of the preliminary, everybody in the court remains in regard as he passes. The truth of the matter is that he carries out a responsibility that no other person around would have done. Atticus is a regarded man and shows it by regarding others. He regards all individuals paying little heed to race, societal position, and doctrine. For instance, he disallows Scout in utilizing the expression "Nigger" to call individuals of colour despite the fact that it is a not an unexpected term which was normally utilized by white individuals in the general public. His choice in protecting Tom gave him terrible results. Atticus requests that his kids keep their respect and not to battle in light of taunting on their dad's choice.

Societies continue to make distinctions based on ethnicity, race, sex or gender and other characteristics that should have no bearing on people's achievement or on their well-being. The report on the World Social Situation 2016 argued that discrimination is one of the key drivers of social exclusion. (United Nations. 2016). Discrimination affects people's opportunities, their well-being, and their sense of agency. Persistent exposure to discrimination, racial prejudice and marginalization can lead individuals to internalize the prejudice or stigma that is directed against them, manifesting in shame, low self-esteem, fear and stress, as well as poor health. Structural discrimination is based on the very way in which our society is organized. The system itself disadvantages certain groups of people. Structural discrimination works through norms, routines, patterns of attitudes and behaviour that create obstacles in achieving real quality or equal opportunities.

In the novel, few characters need to change the severe guidelines in the general public. By their reactions, they plan to show their legitimate mentality toward Blacks. Atticus Finch's inspiration in guarding Tom Robinson is to show his youngsters life. He wants to set an example to his children by being caring and thoughtful to people around him. He likewise needs to wake his general public from a fantasy that Whites are awesome and clean. The story is invigorating, and there are a few extraordinary examples that can be learned. The tale of this novel truly addresses all issues that are still genuine in this present reality, like racial segregation, social class, bias, and orientation issues. The general public in the novel is the significant reason for the person's responses.

Conclusion

Racial prejudice is a rigid and unfair generalization and assessment which is done by certain people towards other people without knowing clearly about them. This research is a qualitative study applying the content analysis method. The object of this study is Harper Lee's *To Kill A Mockingbird*. The data collected are words, phrases, clauses and sentences related to racial prejudice, marginalization, blacks and morality found in the novel. The data analysis was conducted by classifying and categorizing the data to find the inferences. In achieving the reliability, the researcher read the novel carefully and comprehensively, then recorded the data into a systematic framework based on the theory.

The result of this study shows four important points-racial prejudices in the novel, the causes of the racial prejudice, the impacts of the racial prejudice, and racial prejudices in the novel reflecting the real condition of racial prejudice in Alabama. First, there are some racial prejudices which are done by many Maycomb people against families with different habit and against black people, due to lack of moral education. Second, the causes of the racial prejudice are divided into two categories. Those are differences in custom and differences in race. Third, the impacts of the racial prejudice are discrimination, segregation, and oppression in society. The reflection of racial prejudice in the novel toward racial prejudice in the real condition in Alabama. Scout consistently resists the notion that women are a form of property. In fact, throughout the novel Lee uses scout's reflections to expose the performative aspects of gender or the ways in performative aspects of gender like results from what feminist's critic Judith Butler describes as the "repeated stylization of the body, a set of repeated acts within a highly

rigid regulating frame that congeal overtime to produce the appearance of substance of a natural sort of being". This book is an innocent, sensitive portrayal of three children- Jem, Scout and Dill growing up. The emotional, physical, and psychological changes they undergo as adolescents' steps in, captured in a natural, closer to life fashion.

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and bad of society. Even though he was isolated most of his life, when Boo witnessed Bob Ewell attack Scout and Jem, he came to the rescue from his isolation and defended them and killed Bob Ewell. "Boo left the safe environment of his home to risk his life for hers and she knows his essential goodness and vulnerability need protecting." (Feltz 298-300). Atticus and Heck Tate knew they couldn't publicize his actions, and claimed Bob Ewell's death as an accident to protect Boo. Being the lawyer and fair minded person that Atticus was, he knew for a fact that Tom Robinson would never win the trial no matter what the argument was. To do the right thing, and stand up for what is right, Atticus fought for him anyway. Scout was curious and questioned her father's reasoning and he said, "For a number of reasons...The main one is, if I didn't I couldn't hold up my head in town, I couldn't represent this country in legislature, I couldn't even tell you or Jem not to do something again." (Lee 16-25

CHAPTER 7

REVISITING DATA MINING TECHNIQUES: STRENGTH AND WEAKNESS

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Dr Vaishali Singh

ABSTRACT

Data is collection of facts used to calculate, interpret and analyse statistical information. In easy words, collection of important information is Data whereas Mining means to ‘dig in’ which in technical terms means to exploit a skill or a particular source of information and analysing it to generate new information. Data Mining is the process of finding inconsistencies, patterns and irregularities in large data sets to interpret and form a meaningful conclusion out of it. The paper aims to focus on the in-depth study on the concept of data mining. The paper will also highlight the strength and weakness on the basis on parameterized study of the existing Data Mining Techniques.

Keywords: Data, Data mining, Information, Data Mining Techniques

INTRODUCTION

Data Mining has shaped the way of online shopping for many companies like Facebook, Instagram, WhatsApp, and Amazon. Data Mining basically helps to understand the patterns of use by users from all parts of the world. The best part about the process of data mining is that it happens without us users realising about it.

According to Forbes, “In one study, 100 million Instagram photos were used to learn global clothing patterns. What would have been an impossible amount of data to review is increasingly possible thanks to machine learning. This work showed the potential for machine learning to help extract insights when studying humans and social, economic and cultural factors around the world. This study exhibited the power of big data and technologies such as computer vision, automated analysis algorithms and machine learning to comb through enormous data sets that are created by social media sites to gain understanding about the world around us.”¹

Twitter, Facebook, Instagram are social media handles which enhance the performance of its platform for its users and many other companies which advertise on it. This is done in order to search, explore and remove malicious and offensive content from these platforms. This enhances user experience and gives customer satisfaction to the users of these social media handles. Data Mining for these platforms can be helpful in two different ways, one is by using

the large amount of data to improve the website and make a better community or to use the large and enormous amount of big data to understand the user behaviour.

According to World Economic Forum, At the beginning of 2020, the number of bytes in the digital universe was 40 times bigger than the number of stars in the observable universe which means at present there is more data in this world than the number of stars visible to us.²

According to Forbes, in 2019 it was reported that only 27% of organizations were able to make full use of their data to convert it into a meaningful message, with the growing data skills gap cited as a primary reason.³

Usage of data by Companies

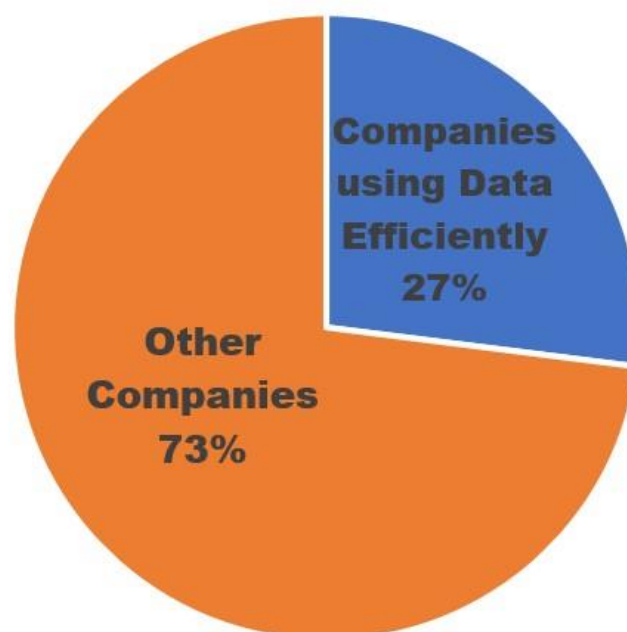


Figure 1: Usage of data by companies

With the amount of data growing on an exponential level, it is required to have improved analysis so as to extract information that best matches interest of the users.

This research paper sheds light on the techniques to mine data, including the strengths and weaknesses of the techniques used to do it.

Research Questions

There are 3 most basic questions that arise the vast topic of Data Mining are:

Firstly, what are the methods of Data Mining?

The answer to this question is that there are many methods used for Data Mining, but the crucial step is to select the appropriate form from them according to the business or the problem statement. These methods help in predicting the future and then making decisions according to the analysis. These also help in analysing current trends in market, interpreting that information, and increasing the revenue of a particular company.

Some Methods are:

Association, Clustering Analysis, Classification, Prediction, Decision Trees, Sequential Patterns or Pattern Tracking, Market Basket Analysis and Neural Networks

This research paper focusses on some of these methods in detail.

The next most important doubt this research paper focuses on is about the necessity of Data Mining.

Data mining can automate the process to find predictive information in a very large database. A common example of this problem which is predictive is targeted marketing. Some other predictive problems include forecasting bankruptcy and other forms of default and identifying segments of a population likely to respond similarly to given events.

Data mining tools sweep through databases and identify previously hidden patterns. An example of pattern discovery is the analysis of retail sales data to identify seemingly unrelated products that are often purchased together.

Lastly, the threats in Data Mining.

According to National Telecommunications and Information Administration,

The United States Census Bureau in a survey conducted in 2017 found out that 73% of American households with internet are concerned about cybersecurity and online privacy and roughly almost 33% said this has made them hold back on their daily online activities.⁴

The reason for this is obviously due to the concerns related to security and privacy of an individual's personal details and personal data.

The Objective of this paper is to identify the best methods of extracting Data from users whilst trying not to compromise any personal data during it.

LITERATURE REVIEW

Data Mining can be seen here of various uses which might be beneficial to some but harmful to the others. Data Mining is a secret weapon of the marketing process in today's modern fast-paced day-to-day life.

This process makes it easy to predict the needs and types of product or services a person uses or might use in the future. Once the company knows this, it will result in substantial increase in the sales of that company making it a profitable business. Sometimes with the help of these

algorithms one can know what the customer will buy and at what point of time without the customer realising it! This is the power and potential of Data Mining.

With many advantages there are always disadvantages too, so are in Data Mining. In this Research Paper, the Strengths and Weaknesses of Data Mining have been discussed properly for the average user to understand what it happening to the data they send unknowingly on this vast internet. This paper focuses on the Techniques used for mining data using different ways, which is followed by each methods' Strength followed by its Weakness.

This paper presents various methods for Data Mining like Market Basket Analysis, Clustering Analysis, Neural Networks and Decision Trees.

This paper describes some of the methods which are used to gather data from large and unorganized data sets to gather valuable information and form meaningful conclusions out of it.

As stated above, data mining techniques are used to generate descriptions and predictions about a target data set and describes data through their observations of patterns, associations, and correlations.

This paper states all the above techniques in detail to understand the process of Data Mining.

Methods and Data Collection

a) Market Basket Analysis:

This technique is similar to the methodologies that study the composition of a shopping basket of different types and variety of products or items which one can purchase while shopping.

This technique is very famous in grocery store operations, restaurants, and other retail businesses.

The most important benefit one can gain from market basket analysis is to find an item or a product that a customer buys at the same time or buys together. This type of information can be used by online retail companies like Amazon to recommend these products to the user when they are buying on of the two products.

Amazon also has a 'Buy it with' or 'Frequently bought together' or a 'Customer who bought item this also bought' column on every product webpage and its app where it customises a cart containing additional products for the user or suggesting which products were combined together. This increases the chances of more products to be bought at the same instant and it in a way saves the time of the user providing them convenience.

According to LinkedIn, 37% of all of Amazon sales come from its algorithm recommendations.⁵

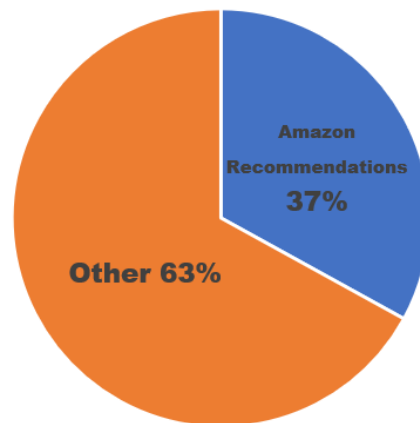


Figure 2: Amazon sales from recommendations

It's too big of a slice to ignore when talking about Amazon's sales. And it is foreseen that Amazon will put more into their personalization efforts in view of its impact. Start taking advantage of the Frequently Bought Together feature now to drive net new business as well as keep existing customers coming back for more.

If someone tries to duplicate a conclusion drawn to chainwide data to merchandise a single store, there is no doubt that there won't be some speed bumps or errors.

As stated on cb4.com, "An infamous version of this pitfall in the retail world is that of the 'beer and diapers' correlation. Way back before 'big data' (the '90's), a retail company ran SQL queries against its store data and discovered that beer was often purchased with diapers. This discovery quickly caught wind, and stores started to put diapers and beer nearby on store shelves. Naturally, sales of the two together went up."⁶

The issue is this... Of course sales went up for the combination of items; stores were merchandising them next to one another in a highly trafficked area. The root of the problem is that you can't seek out and validate correlations in data that you had a hand in creating. Thus, although market basket analysis may help you spot a trend, once you act on it, it's difficult to assess the validity of the correlation."

b) Clustering Analysis:

Clustering Analysis is another technique used for Data Mining. Clustering Analysis is a form of analysis which is based on an unsupervised Machine Learning-based Algorithm.

Clustering Analysis is a type of analysis in Data Mining which mainly focuses on an unsupervised Machine Learning techniques and algorithms.

Clustering is actually identification of classes and objects which are similar to each other. When using these clustering techniques, it can be further identified whether a region is dense and sparse in an object space and can discover the overall distribution pattern and the correlations among the attributes of the data used, The approach of classification is important and effective in the use of means of distinguishing classes or groups of an object but it is actually very costly so clustering process can be used as a pre-processing approach for subset selection of attribute

and classification. An example to illustrate this is to form a group of customers based on their purchasing patterns, to categories genes with similar functionality.⁷

In the process of clustering a given data set is partitioned in homogenous groups on the basis of some pre-requisite features such that similar objects can be kept in one group while objects not similar are kept in different groups. This is actually the most important and unsupervised Machine Learning problem. It also deals in searching for structure in a collection of data which is unlabelled. It is shown better in Figure 1 below:

With the help of Clustering, data can be split into several subsets. Each of these subsets contains data similar to each other, and these subsets are called clusters. Now that the data from our customer base is divided into clusters, we can make an informed decision about who we think is best suited for this product.

Let's understand this with an example, suppose we are a market manager, and we have a new tempting product to sell. We are sure that the product would bring enormous profit, as long as it is sold to the right people. So, how can we tell who is best suited for the product from our company's huge customer base?

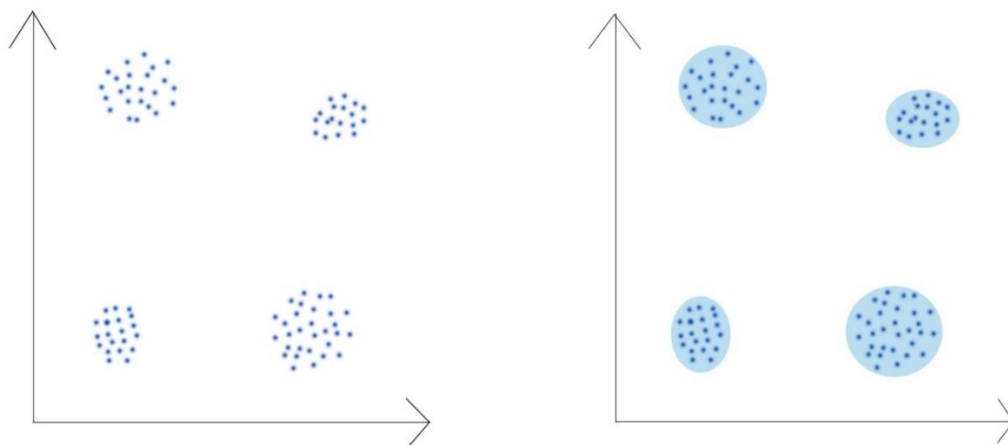


Figure 3: Showing four clusters formed from the set of unlabelled data

Clustering Analysis has its use to first input data, followed by determining patterns and anomalies or similarities in that input data.

For there to be a good clustering analysis algorithm, the aim is to obtain following clusters:

If the intra-cluster similarities are more, this indicates that the data present inside the cluster is similar to one another.

But if the inter-cluster similarity is less, then it indicates that each cluster holds data that is not similar to other data.

The definition of cluster is that it is a subset of objects which are similar to one another.

A subset of objects such that the distance between any of the two objects in the cluster is less than the distance between any object in the cluster and any object that is not located inside it.

The proper meaning of clustering in Data Mining is that it is the process of converting a particular group or set of abstract objects into classes having similar objects.

It is a method to partition a set of data or objects into a group of distinguishable subclasses also known as clusters.

This should help users to interpret and understand the overall structure or natural way to group data sets and use that either as a single unique instrument to get better understanding in data distribution or it can be beneficial as a pre-processing step for all the other algorithms or processes.

1. Scalability of data:

This process in Clustering Analysis can imply that as the number of data objects is increased, the time to implement clustering also increases based on the complexity order of the algorithm. An example to illustrate this is that if K-means clustering is performed then, it is known that it is $O(n)$, here n is the number of objects in the data. If the number of data objects is increased by 100 times, so the time taken to perform Clustering Analysis on them will also increase by 100 times. From this example it is understood that there is a Linear Relationship and if that is not the case, then there is some error with the process of implementation.

Data given should have scalable property. If it is not scalable then wrong result is received. The figure below shows the example where wrong result is found.

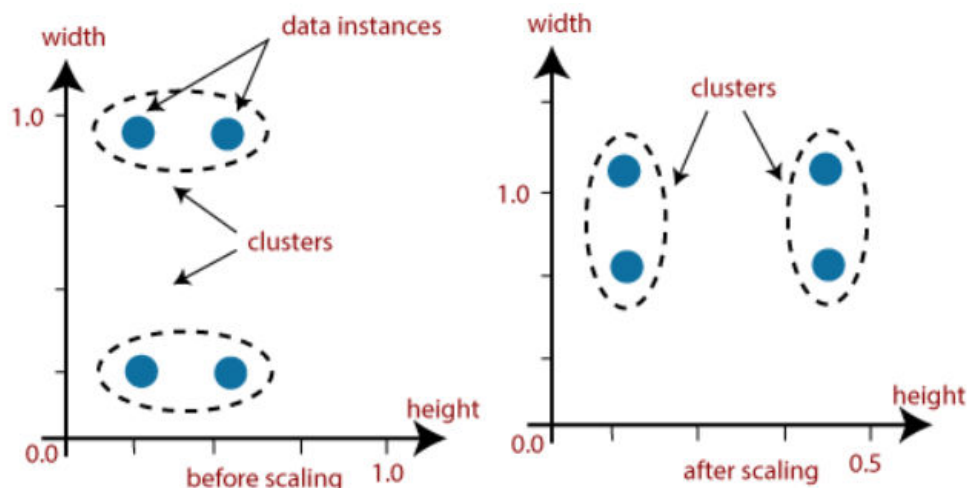


Figure 4: Showing example where scalability may lead to wrong result ⁸

2. Noisy data:

The algorithm should be able to deal with noisy data. Many Databases have noisy, missing, or incorrect data. Some algorithms are sensitive to such data due to which they result in poor quality clusters which cannot be easy to interpret or comprehend.

3. Dealing with different attribute types:

Algorithms should be capable of being applied to any data such as data based on intervals (numeric), binary data, and categorical data.

The algorithms used should have the property to be applied to any kind of data which is based on numeric intervals, categorised or binary data.

4. Interpretability of data:

The result of Clustering Analysis should be easily understandable. It should be such that it is usable, and easy to interpret and comprehend.

5. High dimensionality of data:

The clustering algorithm should handle all types of dimensions of data and not only high dimensional data space.

6. Differentiating clusters by shape of attribute due to data sets:

The clusters should not only find spherical small sized clusters but instead find cluster of all random and different shapes and sizes, after the clustering analysis it should be easy to find random cluster shapes.

Some weaknesses of clustering analysis to form market segments are discussed below:

The process of clustering analysis is a simple statistical process to group similar and inter-related numbers into data sets. What is important to understand here is that data can be inter-related by chance without being actually related. So there are limitations in using clustering analysis for market segmentation uses as there is no defined logic for statistical aspect of calculations done by this algorithm.

The process of Clustering analysis completely relies upon suitable consumer data and biggest problem of cluster analysis for a marketer is the need to have gain access to legitimate consumer information. Service firm, for example, may have a reasonable customer database which can then be utilized to complete cluster analysis algorithms and finally identify different segments of market but larger firms and companies will more easily gain access to suitable marketing research survey data which in this case will not only be more in amount but also have legitimate data. The smaller firms are more likely to have smaller and inappropriate or non-useful data, as a result Clustering Analysis won't be easy to perform.

c) Neural Networks

Another process for data mining is Neural Networks. This is a brain metaphor to process information. These models are inspired biologically instead of an exact replica to illustrate how the brain functions. Neural networks have been shown to be very promising systems in many forecasting applications and business classification applications due to their ability to “learn”

from the data, their nonparametric nature (i.e., no rigid assumptions), and their ability to generalize. Neural computing refers to a pattern recognition methodology for machine learning. The resulting model from neural computing is often called an artificial neural network (ANN) or a neural network. Neural networks have been used in many business applications for pattern recognition, forecasting, prediction, and classification. Neural network computing is a key component of any data mining tool kit.⁹

Neural network method is used for classification, clustering, feature mining, prediction and pattern recognition. It imitates the neurons structure of animals, bases on the M-P model and Hebb learning rule, so in essence it is a distributed matrix structure. Through training data mining, the neural network method gradually calculates (including repeated iteration or cumulative calculation) the weights the neural network connected. The neural network model can be broadly divided into the following three types:

- (a) Feed-forward networks: It regards the perception back-propagation model and the function network as representatives, and mainly used in the areas such as prediction and pattern recognition;
- (b) Feedback network: It regards Hopfield discrete model and continuous model as representatives, and mainly used for associative memory and optimization calculation;
- (c) Self-organization networks: it regards adaptive resonance theory (ART) model and Kohonen model as representatives, and mainly used for cluster analysis.¹⁰

Some Weaknesses of Neural Networks are described in the following paragraphs:

1. Amount of data

Neural networks generally require a lot of data which is more done compared to traditional machine learning algorithms. This problem is very difficult to deal with as many machine learning problems can be solved easily with less amount of data other algorithms of data mining are used.

2. Computationally expensive

these neural networks are usually more expensive on computational basis as compared to the traditional algorithms. The amount of power on a computational level that is required for a neural network is dependent largely on the size of data provided to it but also depends on the complexity and the depth of the network being used.

For example, a neural network with one layer and 50 neurons will be much faster than a random forest with 1,000 trees. By comparison, a neural network with 50 layers will be much slower than a random forest with only ten trees.

d) Decision Trees

Decision trees is another technique of data mining. decision trees are actually tree shaped structures which can represent sets of decisions. the approach of using decision trees can help to generate rules for the distinguishing of a data set. Some decision tree methods include Classification and Regression Trees (CART) and Chi Square Automatic Interaction Detection

(CHAID). CART and CHAID are decision tree methods or techniques used for data set classification. They provide a set of instructions or rules that can be applied to a new (unclassified) data set to predict which records will have a given outcome. Typically, CART requires less preparation of data than CHAID process.¹¹

Decision trees are many times more easily interpretable than some other classifiers like Neural Networks and they can support machines based on vector processes. This is because they combine simple questions about data in an easily interpretable way. The approaches for extracting some decision rules from these decision trees have also been successful. But unfortunately some small changes in the input data can often lead to very large variations in the tree that is constructed the decision trees are very flexible enough to handle items with a mixture of real valued and categorical features along with some features which are missing. The decision trees are very expensive enough to model a lot of partitions of the data that are not very easily achieved with classifiers and are reliable on a single decision boundary (search as logistic regression or support vector machines). Even after that some data that can be easily and perfectly divided into classes through hyperplane might require a large decision tree if only simple threshold tests are used. This method of the Decision trees supports classification play more than 2 classes which can be modified to handle problems of regression. But finally once they are constructed, they help to classify items very quickly.¹²

Some limitations of the use of decision trees are stated in the following paragraphs:

The decision tree split for numerical variables uses millions of records. Due to this the time complexity for operating this operation is immeasurably high and it can continue to rise as the number of records received are increased. As the input increases the time for training time complexity also increases.

Overfitting, is one of the most heavy and strenuous methods for decision tree models in Data Mining. This problem of overfitting can be solved by setting some constraints on the model of parameters and method used for pruning.

In the process of decision trees overfitting is necessary and because of this problem there is a very high have probability that there can be inaccuracy in the output which can lead to high variance in the result. It is difficult to use reusability in decision trees as in a decision there are few variations in the data that might generate a completely different decision tree.

Decision trees can't be used in big data, if the size of data is too large, then a single decision tree may grow a lot of nodes which will lead to complexity and which further leads to overfitting and even after that there is no confirmation or guarantee to return the 100% efficient decision tree.

Data Presentation/Findings

As we can see from these graphs that the Big Data Market Size Revenue is increasing every year, from 7.6 billion us dollars in 2011 to a projected growth of 103 billion us dollars in 2027 (Figure 5). On the other hand, as the size of data has increased, efficient use of this data by Amazon has led to an increase in its sales too, from around 7 billion us dollars sales in 2004 to around 470 billion us dollars in 2021 (Figure 6).

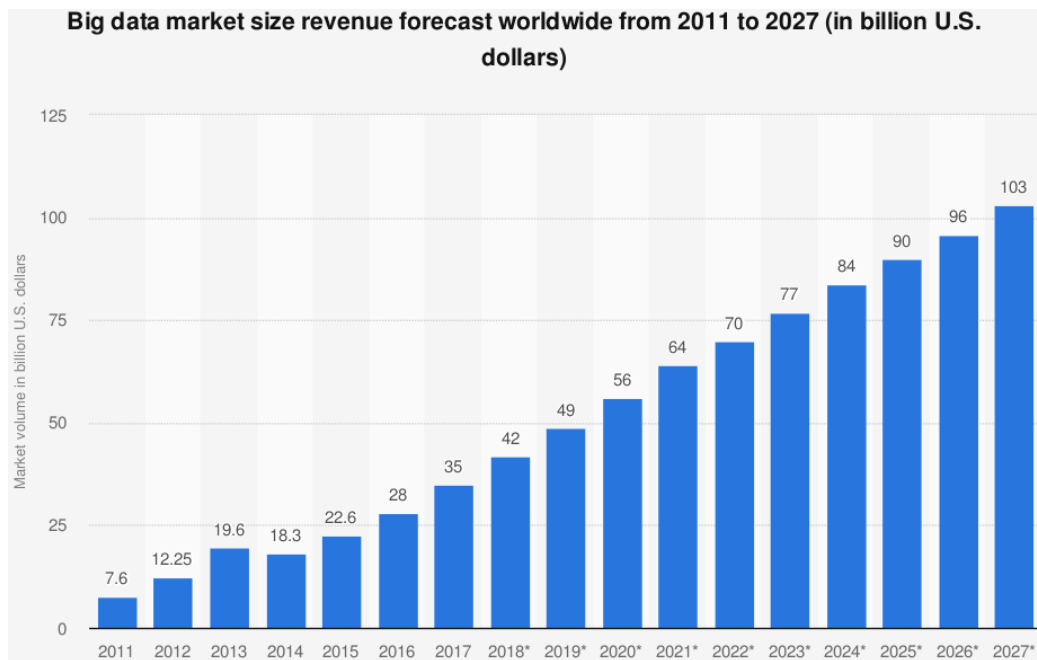


Figure 5: Big data market size revenue forecast worldwide from 2011 to 2027 (in billion U.S. dollars) ¹³

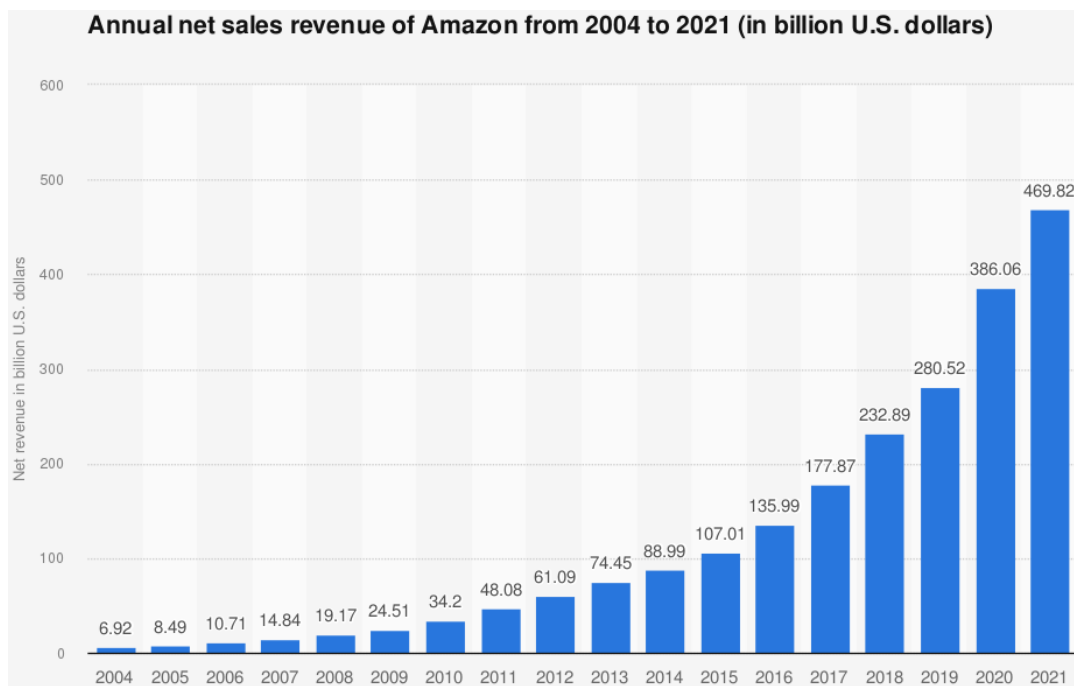
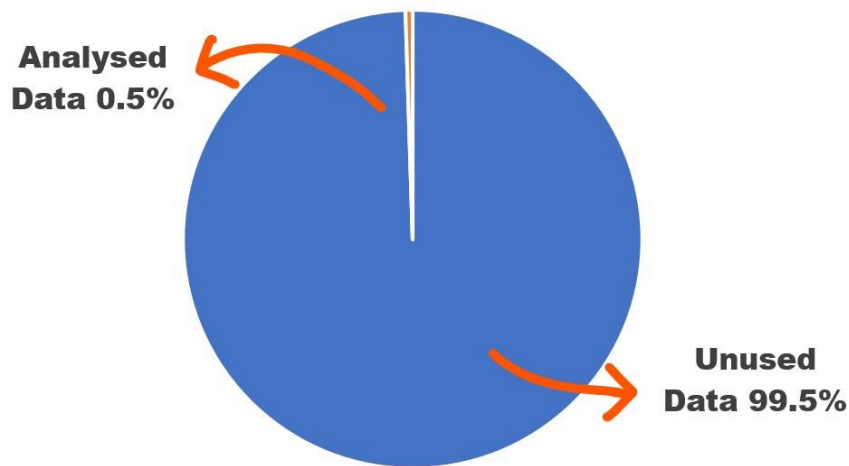


Figure 6: Annual net sales revenue of Amazon from 2004 to 2021 (in billion U.S. dollars)¹⁴

Netflix currently save \$1bn a year by recommending content that keeps customers engaged and are subsequently able to confidently spend \$6bn a year on their own content.¹⁵

These are exceptionally good numbers for a business to grow but on the other hand, in 2020, each of the 7.7 million people in the world produced 1.7 megabytes of new information every

second of every day, and as seen in the second Pie-Chart currently only 0.5 percent of all data is ever analysed and used, according to research firm IDC.¹⁶



Imagine what could be the power of Data Mining, if a business firm uses these algorithms to its full potential and not just 0.5% of it.

CONCLUSION

To conclude this research paper, it is important to note that Data plays a very important role in human's lives without us realising it. Data mining helps to develop smart market decision, run accurate campaigns, make predictions, and more; With the help of Data mining, one can analyze customer behaviors and their insights. This leads to great success and data-driven business.

Data also has to be mined in the correct form or manner to make the full use of it. The above methods like Clustering Analysis, Decision Trees, Market Basket Analysis, and Neural Networks are some of the most important methods or techniques to analyse the data using the process of Data Mining.

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⁶ cb4.com

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¹⁶ Research firm IDC

CHAPTER 8

INTERNET ADDICTION AMONG ADOLESCENTS ACROSS GENDERS

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Ms Shiromi Chaturvedi

ABSTRACT

The internet today has become an integral part of daily life that facilitates communication, education, and entertainment. The behavioural pattern of excessive internet usage has similarities to substance addiction, such as tolerance, withdrawal, repeated failure to reduce or quit, and impairment in daily life. The present study aimed to assess the heightened risk of internet addiction during the pandemic and its effect on adolescents across genders. For the purpose of this research, a sample of 100 college individuals from Jaipur was selected using the convenience sampling method. The Internet Addiction Test developed by Dr Kimberly S. Young (1998) was circulated among the students to find out the prevalence of internet usage. A t-Test was then applied to assess whether there exists a significant difference in internet usage patterns across genders.

Keywords : Internet addiction, adolescents , internet usage , gender differences

INTRODUCTION

Along with new technologies, the Internet has reshaped and upgraded many facets of our lives by being integrated in the daily experience, by becoming more available, offering many services and its growing usage in every age group (Singh & Paliwal, 2020). Provided that the internet has become an integral part of social and professional life, it is critical to comprehend the fundamental reasons for its use, as well as the ambiguity of its impact and aspects of both positive and negative social consequences, which has prompted researchers from various fields to investigate the issue (Arshinova & Bartsalkina, 2010; Gubanov & Chkhartishvili, 2009; Khil'ko, 2015; Khutornoi, 2013).

While it is generally speculated that using technology is a positive experience, especially among young people, as it can help improve results on tests and expand and increase motivation for learning (Guan & Subrahmanyam 2009), recent factual and empirical research suggests that technology addiction enhances and complements a user's intrinsic and extrinsic gain perceptions about a system, resulting in system overuse at a dangerously high level (Turel et al., 2011).

The so-called Internet addiction issue is one of the negative social and psychological effects of the Internet's impact. Internet Addiction can be described as an individual's inability to control his or her own use of the internet causing disturbances in relationships, household, scholastics,

and work commitments (Zhang, Lim, Lee and Ho, 2018). Global researches conducted throughout have revealed that internet addiction might also create psychological and physical difficulties in the individual (Kraut, Patterson, Lundmark, Kiesler, Mukhopadhyay, & Scherlis, 1998; Black, Belsare, & Schlosser, 1999; Shapira, Goldsmith, Keck, Khosla, & McElroy, 2000).

Adolescents are identified to be most vulnerable to Internet addiction as they have less ability to control their enthusiasm for Internet activities (Yen, Ko, Yen, Chang, & Cheng, 2009). Adolescents and young adults are more likely to use the internet for a variety of purposes, including obtaining data, social networking, discussing, playing music, emailing, playing games, and meeting social needs. Due to the decrease in face-to-face social interactions and the increased time spent indoors during the COVID-19 pandemic, there is a growing dependence on social media and online entertainment platforms for social interaction (Karki et al., 2021).

In the forward logistic regression analysis of a research, due to the COVID-19 outbreak, high impulsivity, high virtual social support, older age, low subjective well-being, low family function, and high alexithymia were all independently predictive of Internet addiction among adolescents (Lin, 2020).

Nearly 90% of students were physically cut off from their schools due to the COVID-19 pandemic, and technology became a necessity to enable students to access educational materials, to interact with each other, and to do what students need to do most: play. Among all online activities, playing video games contributed most to the increases in time spent on recreational Internet use and severity of Internet addiction, during the pandemic (Li et al., 2021).

Increased internet availability with widespread devices such as mobile phones and tablets provide adolescents access to and use of the internet during the daytime as well as bedtime. The accessibility of such facilities in developing countries has put adolescents at risk of internet addiction (Kuss & Lopez-Fernandez, 2016). A significant difference has been found in research between male and female students in terms of Internet addiction, where Internet addiction was more common in females than that in males (Najafi et al., 2018 and Orsal et al., 2013).

Internet addiction and internet-use related problems are also associated with significant impairment and distress for individuals, which have been emphasised as the criteria demarcating mental disorders (Kuss & Griffiths, 2014). Besides high risk of psychological distress, Internet addiction among adolescents have been reported to be associated with poor outcomes including physical health (Eliacik et al., 2016), substance abuse (Evren, Dalbudak, Evren & Ciftci, 2014), decreased academic performances (Mohamed & Bernouss 2020), social isolation (Tateno et al., 2019), self injurious behavioural patterns such as suicidal tendencies (Lam, Peng, Mai & Jing, 2009) and low self esteem (Woods & Scott, 2016).

The study's purpose was to identify changes in a student's daily routine variables as a result of internet usage following the pandemic, which is the first and most pertinent approach for managing collateral repercussions like internet addiction across genders, with the goal of assisting policymakers in tracking the student's potential behavioural patterns and, eventually, adopting and suggesting appropriate measures.

REVIEW OF LITERATURE

Excessive internet use is discussed by many researchers with different concepts. “Internet addiction” (Young & Rodgers, 1998), “Internet dependency” (Wang, 2001), “pathological Internet use” (Young, 2004), “problematic Internet use” (Kaltiala-Heino, Lintonen & Rimpela, 2004), “Internet abuse” (Young & Case, 2004), “cyberaddiction” (Chebbi, Kong & Liu, 2001), “obsessive video game playing (Keepers, 1990)” are many of these. In the modern world, excessive uncontrolled internet usage (internet addiction) has become common among students, accompanied by time-consuming computer usage that affects the ability to function normally in important aspects of life (Kannon, Karthik, Pal & Menon, 2019).

The growth of online education has generated concerns about the prospect that using the Internet in schools could affect students' lives, or at the very least increase their chance of getting Internet Addiction. Furthermore, understanding the influence of regular Internet use and the resulting potential disorders on school performance is critical when considering Internet use as a learning tool. This is an area where there is currently a scarcity of literature, and it merits additional exploration. In fact, the findings of a number of studies that looked at the direct association between Internet addiction and academic achievement were equivocal (Ellore, Niranjana, & Brown, 2014; Hawi & Samaha, 2016; Usman, Alavi & Shafeq, 2014).

Studies clearly indicate that misuse of the internet is strongly associated with a number of psychological and behavioural problems. For instance, there exists a great deal of relevance between the misuse of the Internet and issues such as anxiety, depression, loneliness, social isolation, low self-esteem, shyness, abnormal mood swings, precipitated behaviour, and lack of social skills and support (Chiu, Hong & Chiu, 2013). Davis (2001) has developed a cognitive behavioural model for problematic Internet use. In Turkey, relevant studies exist focusing on the Internet addiction and pathological Internet use (Kayri & Günüç, 2008; Odabaşı, Öztürk, Genç & Pektaş, 2007; Oğuz, Zaim, Özel & Saka, 2008; Özcan & Buzlu, 2005; Erarslan, Genç & Kalyoncu, 2005).

In terms of gender differences, Jenaro et al. (2007) argue that 28.6% of all male college students and 56.3% of all female college students are classified as heavy internet users. Moreover, Chiu, Hong & Chiu, (2013) suggest that male college students tend towards Internet addiction, while their female counterparts seem to develop an addiction to mobile phones. According to the studies adopting the Chi-square test for analysis, male college students are more prone to Internet addiction than female ones (Lam, Peng, Mai & Jing, 2009). Results of a study showed that males use the Internet mainly for purposes related to entertainment and leisure, whereas women use it primarily for interpersonal communication and educational assistance (Weiser, 2000). Schumacher and Morahan-Martin (2001) found that males were more experienced with

computers, more likely to have taken high school courses requiring computer use, and reported higher skill levels in applications such as programming, games and graphics than females. Durndell and Haag (2002) indicated that gender effects were found throughout, with males tending to report greater computer self-efficacy, lower computer anxiety, more positive attitudes towards the Internet and longer use of the Internet than females.

Although many studies indicate that males usually have higher levels of IA than females, there exists some contrary data. In a cross-cultural comparison study of IA, males had higher IA prevalence estimates than females (male 15.7% versus female 5.8%) in Chinese samples, and females had higher IA prevalence estimates than males (male 7.3% vs. female 9.7%) in the US. samples (Sun et al., 2012). A significant difference has been found between male and female students in terms of Internet addiction and sleep quality. Internet addiction was more common in females than that in males (Najafi et al., 2018; Orsal et al., 2013). Girls with emotional difficulties such as subjective unhappiness or depressive symptoms had much higher risks of Internet addiction than did boys with similar problems. Further attention should be given to developing Internet addiction prevention and intervention programs that are tailored to fit boys' and girls' different needs (Ha & Hwang, 2014).

METHODOLOGY

The research was conducted using a survey, which was circulated online among the participants. A cross-sectional quantitative survey design was undertaken for the purpose of the study.

A total of 100 adolescents participated in the survey, out of which 50 were boys and the other 50 were girls. These participants belonged to the overlapping intervals of the middle and late adolescence periods.

Convenience sampling, a form of non-probability sampling, was used in the selection process of the participants. The survey consisted of one empirical questionnaire, which was the Internet Addiction Test (IAT) developed by Dr Kimberly Young (1998). Primary examination into the validity of the IAT has shown strong internal consistency ($\alpha = 0.90-0.93$) and good test-retest reliability values ($r = 0.85$) (Samaha et al., 2018).

The instrument comprises 20 items - each was extracted from previous studies and clinical research on obsessive online consumers and their features. These 20 elements evaluate attributes and demeanors related to obsessive use of the internet that comprises escapism, compulsivity, and dependency. The inquiries also examine conflicts in personal, social, or occupational performance that may stem from addictive use. Importantly, these questions are randomised with each statement scored on a Likert-scale with values ranging from 0, indicating less radical behaviour, to 5 indicative of the most radical behaviour for each item. The test could be applied either on an individual basis or in a collective sample. It can be applied in two methods: self-administered and verbally, if anyone requires help in fulfilling the questionnaire. When self-administered, the rest requires 5–10 min to fill (Young & De Abreu, 2010).

The study hypothesised that there is a significant difference in the internet addiction of girls and boys, with boys being more addicted to the internet than girls.

Analysis of the difference between the means of the gender for Internet Addiction, was calculated using t-Test. The t-test applied that is unpaired and two-tailed by design.

RESULTS

The calculated value of 't' is 3.17, which is greater than the observed value ($t=2.8$) at 0.05 level of significance. This implies that there is a significant difference between internet addiction of girls and boys and that boys are more addicted than girls (as observed from the mean value).

Table 1

Result Table for Internet Addiction Across Genders

Group	Number of participants (n)	Mean (M)	Standard Deviation (SD)	Calculated value of t	Observed value of t
Boys	50	48.38	18.64	3.17	2.82
Girls	50	41.64	18.44		

Note: *The value of t is observed at 0.05 level of significance with degree of freedom - 98.

DISCUSSION

The survey aimed to understand the internet addiction in adolescents, with the analysis of the gender differences, using the Internet Addiction Questionnaire developed by Kimberly Young in 1998.

A total of 100 adolescents who were between the ages of 15 and 19, participated in the study. For the purpose of the gender analysis component of the research, an equal number of boys ($n=50$) and girls ($n=50$) were selected. Convenient sampling, a form of non probability sampling was used to select the participants for the study. Internet Addiction Test (IAT), an objective questionnaire, was employed as the survey tool. The survey was cross-sectional and qualitative, by design. T -test were used in the statistical analysis of the data.

Internet Addiction, a concept proposed by Young (1998), is defined as excessive and uncontrollable use of the internet that leads to problematic behaviour and impairments in daily function. Although addiction might come across as a strong word, yet Internet addiction is generally categorised under the label of “technological addiction” and is defined by Kandell as

a “psychological dependence on the Internet regardless of the type of activity once logged on”. (Craparo et al., 2013)

Based on the statistical analysis it was inferred that there was a significant difference between the Internet usage of boys and girls. The means of their scores indicated that boys were more addicted to the internet than girls, by 6.74%.

Results from different fields of addiction have shown an apparent gender-related disparity with females being less prone to exhibiting most addiction behaviours (Minutillo et al., 2016).

Boys are found to have scored lower than girls on IA-related protective variables like effortful control and higher on potential risk factors such as maladaptive cognitions. Thus, A review of 7 studies across different cultural groups revealed that most findings converged with males at higher apparent risk for IA, with the difference in gender-related prevalence estimates of Internet Addiction widening over time (Anderson et al., 2017).

Therefore, based on the statistical analysis, the hypothesis that there is a significant difference between the internet addiction of girls and boys, is accepted.

SUGGESTIONS

Since Internet Addiction shares distinct characteristics with other addictions, clinical therapies for internet addiction are based on therapeutic and pharmaceutical procedures that are routinely employed in illnesses such as OCD, impulse control disorders, and other similar disorders (Singh & Paliwal, 2020). These treatment consists of psychotherapy, medicine, or a mix of the two, as these types of interventions have been demonstrated to be highly effective in reducing the amount of time Internet addicts spend online, as well as in treating depression and anxiety symptoms (Winkler et al., 2013; King et al., 2011; Przepiórka et al., 2014 ; Cash et al., 2012). According to individual practitioners who have seen Internet addicted patients and prior research findings with other addictions, suggestive techniques to treat Internet addiction are: practising the opposite time in Internet use, using external stoppers, setting goals, abstain from a particular application, using reminder cards, developing a personal inventory, entering a support group, and family therapy (Kimberly & Young, 1999).

CONCLUSION

The study revealed a significance level of 0.5 corresponding to 95% confidence interval across genders. Thus rejecting the null hypothesis that stated that there will be no significant difference in internet usage and between male and female adolescents. A recent review of 7 studies across different cultural groups revealed that most findings converged with males at higher apparent risk for internet addiction, with the difference in gender-related prevalence estimates of internet addiction widening over time (Anderson et al., 2017). This pattern may reflect male tendencies to use applications with potentially high internet addiction risk (e.g., online games or cybersexual activities) (Lin, Ko, & Wu, 2011).

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CHAPTER 9

A STUDY OF WIDENING GAP BETWEEN EDUCATION AND EMPLOYABILITY AMONG GRADUATES IN INDIA

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ABSTRACT

Ceaseless gaps between education and employability of the graduates continue to impact organizational performance and global development. The hope for every college graduate is to get a job. The bubble of their hope expands as they wish to get employed in sectors corresponding to their field of study. Beyond that, they continue to hope to get a sustainable and secured job to enjoy their work-life. Unfortunately, this bubble bursts for most of them, as soon as they get out of their degree colleges. Fresh graduates being the primary stakeholders, eagerly wait for the day they get employed. Similarly, the industries wait for a skilled workforce, ready to hit the ground. Somehow, their demands don't match and both of them lack what they wished for. According to a study, millions of graduates are produced by the Indian universities every year, but only 20% of them get absorbed into various industries, which is alarming. The turbulence brought by the Covid-19 pandemic has exacerbated the crisis for the youth of the country.

This paper seeks to find out and bridge the gap between education and employability of graduates in India; based on the analysis of a survey using structured questionnaires involving both the employees and the HR Executives.

Keywords: Skilled Workforce, Unemployment, Ceaseless gaps, Education

INTRODUCTION

Employability is a vital concept in higher education and it is considered as one of the factors to assess the country's socio-economic infrastructure. Graduate employability can be expressed as the compilation of a series of soft and hard skills that a graduate obtains to achieve a desirable job requirement and succeed in their career (Aniss Moumen, 2021. SHS Web of Conferences 119, 05010). According to a study, a large number of graduates in India are forced to take up jobs much below their educational qualifications or enter into unsuccessful entrepreneurial pursuits. This has created a new kind of demand-supply imbalance among the graduates being at the same time, over and under-skilled.

Statement of the Problem

Unemployment is a dismaying situation, within which lies a much worse concern of educated unemployment. One of the main objectives of graduation is to enable the students to find suitable employment opportunities in their desired field (Sarin, Charu. (2019). Analyzing Skill

Gap between Higher Education and Employability). Due to persistence gaps between education and employability, only a small percentage of graduates are able to find jobs and the rest remain unemployed. The expanding size of the educated unemployed has led to a situation of distress and conflict among the graduates, where the privileged section has the option to fly abroad for better job prospects, the middle class has to resentfully settle with whatever they have and the underprivileged or under skilled are thrown out of the race. The transformation of India into a knowledge-based economy is evident but still, the country's performance on the education and employment front has been below average. The tragic irony is that despite being the 6th largest economy in the world, India's employability worldwide ranking is not at all satisfactory.

The root cause of this issue is unskilful schooling and insufficient education at degree colleges, due to which students are not job-ready and there is a gap between the skill set of the graduates and the expectations of the employers. It is now no longer sufficient for a fresh graduate to possess only academic knowledge as employers expect analytical and practical knowledge of the subjects, but since they don't possess it and get defeated in the screening process itself. Thus, having the desired employability skills is highly crucial to enhance their job opportunities. Pay scale and type of job also play a crucial role in the unemployment concern among graduates as these are one the main reasons behind voluntary unemployment. After completion of their degree, every graduate has some essential expectations regarding the jobs and if they don't get fulfilled, they voluntarily remain unemployed, worsening the problem of unemployment.

The study investigates the following questions:

1. Why is there a gap between the demand and supply of employable graduates? (Q1)
2. What makes a candidate more desirable for employment? (Q2)
3. To what extent is the transition from degree to skills true when it comes to employability? (Q3)
4. What is the major skill mismatch that exists in the marketplace? (Q4)
5. What skills does the employer look for while hiring that the graduates are missing? (Q5)

Significance of the study

Fresh graduates are met with the challenge of education and skills in this rapidly changing work environment. Today we see a lot of new work markets that were not there in the past.

There is a huge pool of educated university graduates with unfulfilled aspirations. This group of dissatisfied, disgruntled youth can lead to disastrous consequences for our society (Mahajan, Shobit (2021), Indian Express). Students who graduate, wish to get the desired job but don't get it most of the time. The faulty education framework is somewhere responsible for the concern.

The current education system does not adequately focus on skills that can improve employability, and a large section of labour possess outdated skills (Institute of Rural Management Anand, IRMA, Mangalpura, Anand, Gujrat). Employers expect that students will

be “work ready” after college graduation, having the hard and soft skills that are necessary for the workplace. Unfortunately, many graduates fail to possess these skills resulting in making them undesirable employees. Not just the technical skills but recognizing the importance of soft skills and their impact on specific workplaces is one of the pilot steps that need to be taken corresponding to the needs of our global economy. In addition, according to nearly 75% of employers, candidates who have relevant work experience through internships, make them more preferable. Employers use internships as training programs to evaluate if the candidate has desired skills to convert from an intern to an employee. The educators focus on making the student understand a theory and the employers focus on putting that theory into real-time practice. Learning the employer's need and making a connection between theory and practice can make a student more desirable for the position. Therefore, this education-employment gap could be bridged through internships, where educators, employers, and students come together to provide a learning experience on multiple levels.

Fig 1: Unemployment Rate in India in 2021

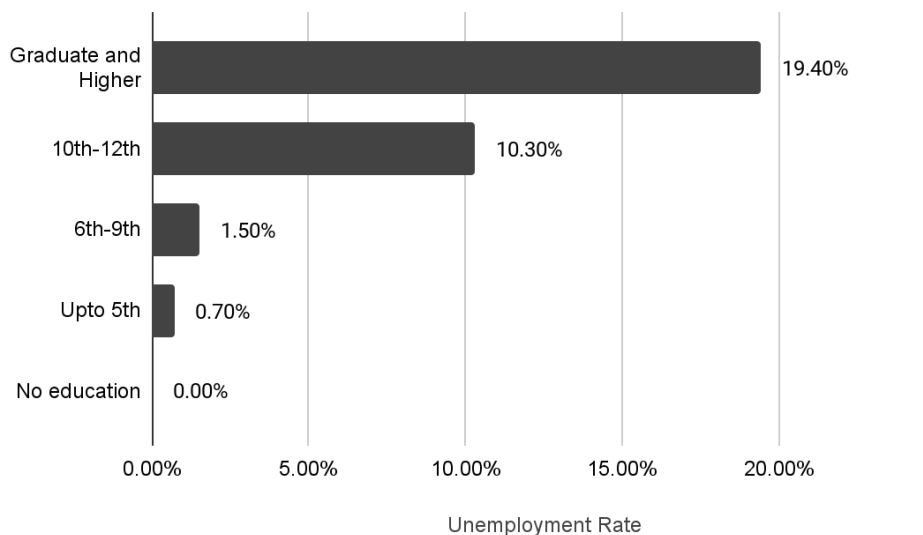


Figure 1: Unemployment Rate in India in 2021

Source: Statista 2022: India’s Unemployment rate by Education in 2021

A survey was conducted by the Centre for Monitoring Indian Economy Pvt. Ltd, (CMIE) between September and December 2021 among the rural and urban households in India. It showed that people who were graduates including those who went further for higher studies had the highest unemployment rate in India in 2021, being 19.4 percent. Individuals who completed their higher secondary education(10th-12th) followed this, with an unemployment rate of 10.30 percent. This trend continues, as the level of education is reduced, the rate of unemployment is also reduced.

Methodology

An online survey was conducted for the graduates and employers to understand the perspective on graduate employability. The sample size was 50 & 25 for graduates and HR Executives respectively. Separate questionnaires were created keeping in mind the respective requirements

of both the stakeholders. The questions were based on a five-point Likert scale and multiple-choice questions were also designed for a better understanding. No subjective questions were asked from the respondents.

The survey was created on a platform called '*Google Forms*'.

Some secondary data, from previously published research and other government websites and reports, were also analyzed for the study.

Objectives

1. To examine the widening gap between education and employability for graduates in India
2. To examine various factors that are responsible for the gap
3. To identify the areas and solutions to bridge the gap

REVIEW OF LITERATURE

Jeemol Unni (2016) identified the skill mismatch in the labour market in India. She also studied the nature of tertiary education, occupation, and industry. The major discussion of the study was about the skill gaps in graduate-intensive occupations, high technology manufacturing, and Knowledge-Intensive Services. The study also analyzed the skill mismatch and closing that gap was one of the key objectives.

Charu Jain (Assistant Professor, Delhi Institute of Advanced Studies; 2019) conducted a study to know the perception of both the stakeholders (i.e., Employees and Employers) about the skills necessary for employment. The study used the Linkert scale to derive useful insights and based on the mean score, it established a ranking order to ascertain the existing skill gap. The findings of the study gave a different picture, where the highest skill gap exists in terms of behavioural skills, according to both the graduates and HR Executives. It also provides recommendations to bridge the skill gap which needs to be incorporated by both the stakeholders.

Tim Goles and others (2011) in their study, suggested a typology of IT skills. To find that out, the researchers gathered data of 96 IT managers and executives. They found out and refined the six categories of skills: foundational, operational, essential, project management. And opportunity skills.

Deepa KT and Shanmugam P. (Department of Economics, St. Thomas College, MG University, Kerala, India) along with **Archana Jayaram** (Department of Economics, Bharathiar University, Tamil Nadu, India; 2019-20) studied the socio-economic characteristics of the respondents residing in the Coimbatore district. It also traced out the gap between education and employment based on a field survey conducted in the area and concluded that skill and experience along with proper educational qualification have a significant impact on employment. There is a positive relationship between education and employment prospects.

Aya Okade (2012) studied and re-evaluated the current state of education, skills development, and employment for the youth in India. They stated that India is suffering from a deep shortage of skilled workers. The reasons they gave for this are a large mismatch in the labor market, limited access to education and skills training, and high rates of school dropout. The paper also recognized the skills gap in India between the skills young people possess and what industries demand.

Monika Aring (2012) conducted a study and drafted a report which reviewed the literature on 120 employer surveys from developed and developing countries which derived the employers' perspective on skill gap and it indicates that employers throughout the world consider "talent" or "skill gap" as one of their top 5 concerns. This study reveals the extent of the skill gap in various countries, describes some of the major causes of the skills mismatch and reveals what employers actually mean when they state that graduates are not "employable".

Vikhe Gautam (2014) studied the gap between academia and industry. They also revealed that, over employability skills, a gap exists between HR managers and training and development officers. They pointed out the need for collaboration of both industry and academia for a win-win situation.

Ming Cheng, Olalkekan Adekola, Jo Clarisse Albia, and Sanfa Cai (2021) pointed out in their study that despite the clear evidence that the responsibility of employability needs to be shared by all key stakeholders, it has been transferred to the Higher Educational Institutions by the UK government. The study also pointed out the gap between employers' expectations for employability and the government's employability agenda.

R. Mary Metilda and Neena P.C (2016) identified the employability skills that were necessary for employment. The purpose of their study was to investigate the gap between the skill set of business graduates expected by the employers and the actual skill set the graduates possess at the time of recruitment.

Thijs Van Rens (2015) in his CAGE/SMF research paper series studied the US data and stated that 60% of the employers of US believed in these reasons for the skill gap: *First*, workers do not adapt to changes in skills demand by attaining the necessary skills they need to find a job. *Second*, firms do not accommodate changes in skills supply by creating jobs that use skills that are available in the labor market. *Third*, lack of wage-based incentives for the workers to acquire scarce skills. The researchers suggested that the skill gap will not reduce by increasing the emphasis on scarce skills in schools, colleges, and universities. If wage-based incentives for certain skills won't be there, students will either reject to acquire these skills or will find employment in some other occupation.

According to **Dr. Atma Ram**, ex-Director General of Council of Scientific and Industrial Research, the problem of unemployment had emerged from the mismatching of academic progress and economic growth. The rate of increase of educated personnel is outrunning that

of the economic growth. The real economic situation and need for the country are paid a little heed by the worn-out education system.

Results and Discussions

Existence of the gap

There is a gap between education and employment due to both lack of sufficient jobs and lack of appropriate skills possessed by candidates. This accounts for the reason behind the unsuitability of a large number of graduates for employment that are commensurate with their degrees. Nearly half of the undergraduate students (i.e., 80% of the total number of the students) are enrolled in disciplines that are least employable. According to our survey, the gap exists due to skill mismatch and the lack of industry knowledge.

According to the survey, 80% of employers believe that technical skills are more important whereas 90% of employees on the other hand consider communication skills to be of high value. This has created a mismatch between both perspectives and has increased educated unemployment in India.

Such gaps can exist sector-wise as well. For instance, the tech industry, to begin with, is facing a shortage of tech talent. According to a study conducted by NASSCOM (National Association of Software and Service Companies), the gap exists all over the world. India's tech demand-supply gap of tech talent in 2020-21 is around 21 percent. Accordingly, the construction sector accounts for a total of 11 percent of the Indian GDP and is the largest employer after the agriculture sector. According to a survey by Global Data, which is a leading analytics company, the pandemic has caused a beating to India's construction industry. The construction industry is also facing a shortage of professionals and skilled talent necessary to recover it from the turbulence caused by the pandemic. According to a research report titled "Real Estate Construction Professionals in India in 2020", by the Royal Institute of Chartered Surveyors (RICS), the number of professionals, and the skillsets for core professionals in this industry has a demand-supply gap of about 85%. Furthermore, according to the C. Madhusudhan Reddy (Chief of Andhra Pradesh State Skills Development Corporation), the drugs & pharmaceutical industry is also going through a serious situation where only 5% of the total graduate were able to secure jobs in this industry in 2020 and the remaining 95% were not possessing the necessary skills.

Reasons for the gap

HR Respondents believe that technical skills are most important whereas the employee respondents think communication skills are. This mismatch acts as one of the roots of the problem of educated unemployment. The on-the-job training of an employee is an additional cost that the company has to bear on new hires. The candidate having the technical skills would always be preferred over the candidate having no or little technical skills. There has to be a balance maintained between soft and hard skills. Focusing on one of them and neglecting the other is not a wise decision. The lack of industry knowledge also plays a vital role in the existence of the gap and serves as a reason behind the unemployment of the youth in India.

According to the survey, almost 65% of employers and 70% of employees believe that internships and apprenticeships are crucial for a job. Having relevant work experience helps the candidate stand out and also builds professional faith in the candidate. Unfortunately, 40% of employees stated that there are no industry-based mentorships and internship opportunities are offered in their institutions. Thus, both skills and work experience help candidates pave their way through the work market.

India produces around 2 million STEM graduates across all fields including undergraduates, postgraduates, and Ph.D. students. Among these, only 35% are suitable for employment, and the remaining 65% need upskills of some kind to get a job in the tech field. The study points out that the Indian universities are lagging in terms of industry-academia tie-ups that are necessary to provide training, internships, and learning to graduates to make them market-ready. With the lack of sufficient skilled professionals in the construction industry, the overall cost of the projects increases due to inefficient utilization of resources. The professionals lack in-depth knowledge about the sector and being restricted to limited domains generates this gap. Another factor increasing the demand-supply gap can be drawn from the belief of the employers who think that most of the fresh graduates are highly unemployable, i.e., they are not “industry-ready”. Similarly, due to the lack of required skills, the gap exists in the pharmaceutical sector as well. Another reason would be the lack of experienced people in the industry, which in turn has created an imbalance.

Some other possible reasons that could generate and expand this gap are -

1. Poor Educational System:

The education system of India does not develop human resources properly. Proper training is not given to the people who are consistent with the present economic environment. Due to this, even those who are highly educated, fail to get an appropriate job in India. When firms hire a person for a job that requires tertiary education, sometimes the firms complain that the person they hired didn't have the quality skill that was required for that job. Thus, when a person with higher education fails to possess certain quality skills, it adds to the firms' on-the-job training costs. This is a result of the poor education of the existing higher education system in India.

2. Market conditions:

When a student is enrolled in high school, most of them are uncertain regarding their career paths. They tend to select the institutions under the influence of their parents, peer groups, or teachers. The student's expectations tend to coincide with reality after a period of time. According to the market conditions and expectations at the particular time period, they need to reconsider their career paths. This time period actually contributes to expanding the existent gap.

3. Over education:

From an economic point of view, being over-educated can also act as a reason for unemployment. The term overeducation refers to when a graduate exceeds their optimum level of education. The overeducated graduates will not compromise on the normal pay scale and will try to find a job according to their educational level. Despite

of the law of labor supply and demand which states that they should get a job regardless of their education level over-education creates conflict as graduates want to earn more due to the educational qualifications attained by them and the employers doesn't have a suitable job that justifies their qualifications. This leads to a wastage of resources and time invested in attaining that education.

4. The imbalance between perspective and realities:

After graduating, the student interacts with various sources regarding the process to go ahead in their career and find a suitable job. They tend to formulate their own ideas and expect outcomes. Whereas the market requires different sizes of labor forces to meet the needs and requirements. The employer's point of view may sometimes differ from that of the graduates while hiring, leading to unemployment.

5. Skills and ability to hire:

The process of hiring does not only involve educational qualifications but also looks upon the background of the candidate. Maybe the institutions ignore the importance of skills in the practical world, making it difficult for the graduates to approach their careers. After graduation, it is essential to meet the requirements of a job in order to be hired.

Degree vs. Skills

Students spend one-third of their lives acquiring college degrees to find suitable jobs to live the remaining two-thirds of their lives. According to the World Economic Forum's, Jobs of Tomorrow report, if the focus would shift from degrees to skills, there would be a bigger workforce representing a diverse population and will also help bridge the all too familiar education and employability gap. This would mean transitioning to skill-based education and employment infrastructure that welcomes not just credentials and certifications but also the suitability for the job. Based on the estimates of the Forum, more than 1 billion jobs are likely to be transformed by technology in the coming years.

The future of work won't be about the degrees but skills would take over the lead. A job website called Glassdoor listed the names of 15 companies that no longer require a degree, including tech giants like Apple, IBM, and Google. Many companies are offering well-paying jobs to those with non-traditional education or high school diploma (Kasriel, Stephane, Upwork CEO).

The tasks performed by robots, automation, and artificial intelligence have been increasing with time which is disrupting the jobs massively. Machines are eating humans' jobs and not just the low-skilled or repetitive jobs. Artificial intelligence in recent times has shown equal or better results than humans. (Rainie, Lee (2017). PEW Research Center). According to a study, around 38 million students are enrolled in higher education across multiple degrees and colleges The success measure based on the number of jobs rolled out is less than 10%, i.e., not even 3.7 million students are able to get a job after completing their degrees (Aishe.nic.in report, 2019). This gives a clear representation that the future will not be just about college degrees and qualifications. Due to the active emergence of the gig economy, the nature of work is more inclined towards skills. Further, the covid-19 pandemic has given fair reasons to students and professionals to accelerate their careers and modern economy by joining

upskilling and skilling programs. A degree can earn the job but cannot assist in growing further if not accompanied by skills. Therefore, candidates with just degrees won't be able to pave their way through this disruption. Hence, degrees along with the right skills are required to survive and excel in this automated world where AIs and robots are increasingly becoming better to perform tasks efficiently.

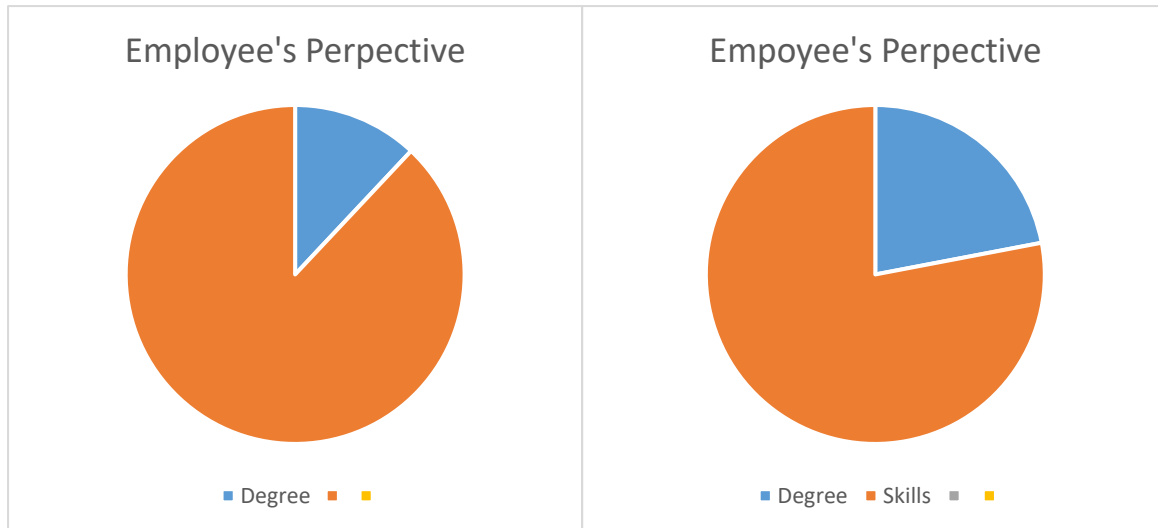


Figure 2 Degree: 12% Skills: 88%

Figure 3 Degree: 22% Skills: 78%

After analyzing the responses from both the employees and the employers. A majority of both the employees and employers (78% and 88% respectively) are firm believers that skills matter more than a degree. Despite this knowledge, the employees are not able to find employment. One of the possible reasons behind this is the skill mismatch. Skill gaps and mismatches basically lead to unfavorable market conditions, youth unemployability, and a reduced pace of economic growth. Skills are not only limited to enhancing workers' productivity but also define the candidate's ability to adapt to the work environment. Some sectors have a larger number of skills than what is required resulting in graduates being underpaid or underemployed. Some sectors that require a high degree of skills that can lead to growth and employment should be prioritized while planning out strategies.

Skill mismatch can be measured using various factors like *overeducation* (have a level of education beyond what is required), *under-education* (have a level of education below what is required), *over skilled* (have a set of skills above what is required), and *under skilled* (have a set of skills below what is required). Skills can even become obsolete due to aging which degrades manual skills, caused due to technological changes. Skill shortages is another term that is related to skill mismatch in a very practical way. It refers to existent vacancies due to unqualified graduates. As the students are unable to offer what a firm asks them, the consequences are borne by both the stakeholders.

Bridging the Gap

The most crucial goal of education is to act as foundations for employability, but there is a mismatch in the expectation and reality. Upon identifying that mismatch, the bridging of the gap is the next step to make. The bridging focuses on 2 areas, first, is the skill-based closing of

the gap which involves methods and ideas to make the candidates learn the necessary skills. Second, is the initiative-based closing of the gap which involves providing platforms to the candidates and crafting policies to help them get the desired job. Closing the gap can be discussed sector-wise as well. For the tech industry, closing the gap would need the increment in the corporate collaborations in tier II and tier III universities to change the curriculum and add introductory to medium-level complexity courses in the field of tech. Similarly, an NSDC analysis acknowledged that, in order to meet the requirements of the construction industry, the areas of legal knowledge, government regulations, networking, language proficiency, financial knowledge, project planning, and management skills, including applications and use of project management software, must be enhanced. To bridge the pharma industry-academia gap of trained and professional workers, the Indian education system should focus on providing expertise in complex areas. To adapt to the needs of the modern pharmaceuticals, Pharmacy Education in India must take cognizance of the deficiencies and modify their curriculum (FICCI-NMIMS report on Industry-Academia Convergence).

According to the World Economic Forum's Future of Jobs Report, almost 50% of the employees would need reskilling by 2025 since technology is being adopted increasingly. The topmost soft skills that the employers think have growth prospects are critical thinking and problem solving, Flexibility, stress tolerance, active listening, resilience, etc are also emerging as important soft skills to be learned in the discipline of self-management. The forum estimates that 85% of the jobs would be displaced due to the shift from human labor to machines.

Table 1 Top 10 Work Skills required by 2025

Analytical thinking and innovations	Leadership and Social Influence
Active learning and learning strategies	Technology use, Monitoring and control
Complex problem solving	Technology design and Programming
Critical thinking and analysis	Resilience and Stress Tolerance
Creativity, Originality and Initiative	Reasoning and Ideation

(Source: Future of Jobs survey 2020, World Economic Forum)

Some possible areas of solution in order to bridge the gap are -

1. The clarity about the task and the backdrop is necessary when working on a project or anything. Theoretical knowledge is something that college will teach, but applying it in real life is what needs to be figured out by oneself. Employers don't want candidates to memorize and replace textbooks. They want employees who can apply theories in real life to solve practical problems.
2. Theoretical knowledge and understanding are useless if a candidate is not able to express it in a lucid manner. The ability to communicate properly demonstrates confidence. The traditional "one size fits all" method is not enough in the present time.

Students need customized mentoring and the space to evolve as confident individuals, which can be done by making them aware of their individual strengths.

3. Improving the pupil-teacher ratio and skills like public speaking, participation in cultural and sports events, student exchange programs, social work, festivals, etc may help in making a candidate confident for the dynamic work environment.
4. Working as interns or taking part in the family business after college hours or starting any sort of entrepreneurial venture will expose the students to real-life challenges and will also tell them the course of action to deal with such challenges.
5. To enter a corporate world, a graduate must have the requisite skills needed for employment. Academics alone is not enough to make a student work ready; skill development plays a vital role in it. While the student is pursuing their graduation, they can easily enhance other skills like fluency in English, communication skills, behavioural skills, interpersonal skills, etc. Sometimes lack of these skills can affect your chances of getting employed. The main conflict comes when the institution itself lacks in understanding the wants of the market and making their students read according to it.
6. The school and college examinations are more or less structured in a manner to assess the knowledge of an individual in terms of the syllabus and curriculum they have in their course. Assessing the candidate in terms of team building or group work skills is also necessary. Thus, to improve teamwork and related skills, participation in cultural activities or sports can help to a great extent.
7. Professional certifications, such as those offered by Coursera, edX, Udemy, LinkedIn, etc., can help you acquire new skills at a very minimal cost without even going through a regular degree program. These platforms offer thousands of courses taught by experts in their fields. Many companies like Amazon (AWS), Microsoft, etc., offer their own certification programs in various IT-related disciplines. Google has also launched a number of online courses with the duration of 3-6 months which aim to help people find suitable jobs.
8. This world has been moving towards digitalization and soft skills have become key to the modern economy. These soft skills cover a wide range of interpersonal skills such as teamwork, analytical thinking, management, problem-solving, etc. Unfortunately, the current curriculum of colleges and universities do not include these skills.
9. Institute for Electronic Governance; It was initiated by the government of Andhra Pradesh, it's basically a non-profit organization that trains young engineers to assess their knowledge through Jawahar Knowledge Centre (JKC) i.e., main activity of IEG. It is a six months model that can be availed for free. It provides top-level training in technical and soft skills, a 24/7 library, high-speed internet, and separate laptops with an aim to create awareness in society. Rajasthan Skill and Livelihoods Department; Rajasthan has created its own position in the education sector for schools, colleges, etc. This program holds the main agency responsible for skill development across the state. Similarly, Rajasthan Knowledge Corporation was established to develop a fresh educational framework that regulates the development needs for IT skills.
10. The main and primary role of higher education institutions is to provide their students with knowledge, skills, and abilities to enter the corporate world. The industry and the

educational institutions should ensure that a common platform is available for the students to carry out value-based curriculum keeping in mind the wants of the market. To reduce the employability gap, we must take action to reduce the existing gap between the industry and faculty. The educational institutions should at least make the student ready to adjust to different cultural settings.

11. Having the skills and not being able to use them is of no use. It is very important to identify your skills, organize them, plan them and use them according to the situation. Sometimes a person lacking some of the skills can get the job because he/she knows how to handle the situation better than the other. To incorporate these skills in the graduates the institution must conduct different activities like brainstorming, role play, simulation, fieldwork, teamwork and site visits, etc.

The changing market situations and the high shifting prospects from human labor to machines suggest that demand for some jobs will increase over the next five years, while for others it will shrink. Candidates aligning their skills with the job positions that have a high demand in the future will flourish in their careers and will be able to sustain longer in their desired jobs. Some of such high and low-demand jobs of the future are listed in the table below.

■
Table 2

S. N	Increasing Demand	S. N	Decreasing Demand
1	Data Analyst and Scientists	1	Data entry clerks
2	AI and Machine learning specialists	2	Administrative and executive secretaries
3	Big Data specialists	3	Accounting, book-keeping and payroll clerks
4	Digital Marketing and strategy specialists	4	Accountants and Auditors
5	Process automation specialists	5	Assembly and factory workers
6	Business Development professionals	6	Business services and administration managers
7	Digital transformation specialists	7	Client information and customer service workers
8	Information security analysts	8	General and operations managers
9	Software and application developers	9	Mechanics and machinery repairs

10	Internet of things specialists	10	Material recording and stock-keeping clerks
11	Project managers	11	Financial analysts
12	Business services and administration managers	12	Postal services clerks
13	Database and network professionals	13	Sales rep, wholesale and manufacturing, technical and scientific products
14	Robotics engineers	14	Relationship managers
15	Strategic advisors	15	Bank tellers and related clerks
16	Management and Organization analysts	16	Door-to-door sales, news and street vendors
17	FinTech engineers	17	Electronics and telecoms installers and repairs
18	Mechanics and machinery repairs	18	Human resource specialists
19	Organizational development specialists	19	Training and development specialists
20	Risk management specialists	20	Construction labourers

(Source: Future of Jobs survey 2020, World Economic Forum)

CONCLUSION

The purpose of the study was divided into 3 stages, identifying the gap, finding out the reasons behind the gap, and discovering areas and solutions to bridge the gap. The perspectives of both the employers and the employees were recorded through an online survey.

The findings of the paper indicate that the gap between education and employability exists due to a mismatch in skills. HR executives consider technical skills to be of high value and on the other hand, employees give importance to communication skills. But, in reality, both of these are equally important to secure a job, and thus focusing on one and neglecting another is not preferred. Since both stakeholders believe that skills matter more than a degree, this paper supports the saying that “skills, not a degree, will shape the future of work” Another finding recommends that in order to satisfy the requirement needed in the labor market, academic institutions and employers should collaborate to derive strategies and frameworks to enhance employability. Also, prospects the internships and apprenticeships need to be expanded because employers prefer those who are ready for the work market and have some real-life experience. The skill gap also is quite evident due to the mismatch in the perspectives and expectations of both the stakeholders which indicates that a communication gap exists between

universities and employers which needs to be addressed as well. The skilling ecosystem in India has been improving every day and has witnessed some great policy reforms that might act as strong foundations and will create a stable platform for all the stakeholders. Hence, it is essential to note that a more stable mechanism needs to be established between educational institutions, government, and industry in order to make more flexible and reliable policies.

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CHAPTER 10

MULTI-LEVEL MULTI CLASS COVID CLASSIFIER FOR AUTOMATED EARLY DIAGNOSIS USING DEEP LEARNING TECHNIQUES

Sudhanshu Patel

ABSTRACT

In December 2019, a global pandemic of the novel corona virus disease (COVID-19) wreaked havoc on the planet. The Reverse Transcription Polymerase Chain Reaction (RT-PCR) is the most widely used approach for identifying COVID-19 disease, it has a number of limitations, including false positives, low sensitivity, high cost, and the necessity of a professional to administer the test. There is an increasing demand for a fast-screening method that is accurate, quick, and low-cost. As an alternative or confirmation method, the use of chest X-ray (CXR) scan images may be advantageous. Patient overcrowding in emergency rooms and urgent care facilities may be alleviated by using chest X-ray data to analyze COVID-19 patients. Artificial intelligence (AI) techniques based on deep learning play a key function as high-performance classifiers in the diagnosis of disease employing chest X-rays. There are various ways to categorize CXR images and diagnose COVID-19 infections in the literature, although the vast majority of these approaches can only distinguish between two groups (e.g., COVID-19 vs. normal). COVID-19-associated CXR images must be categorized using robust models, which include bacterial pneumonia, non-COVID-19 viral pneumonia, and normal CXR images... COVID-19, non-COVID-19 viral pneumonia, bacterial pneumonia, and normal CXR images collected from various public sources should be identified using a pretrained Alex Net model, according to the results of the present research. Accuracy rates of 92.00% and 71.97% were attained in the four-way categorization training and testing (i.e., COVID-19 vs. bacterial pneumonia vs. non-COVID-19 viral pneumonia vs. normal).

Keywords: AlexNet, Bacterial pneumonia, Chest X-rays images (CXR), COVID-19, viral pneumonia.

INTRODUCTION

The rapid and precise detection of infected patients is critical in the battle against COVID-19. As extensively utilized screening procedures, chest X-Ray (CXR) play a crucial role in the identification of COVID-19 patients, particularly when viral testing is in low supply.

According to studies, abnormalities in the CXR picture occur in certain individuals before the onset of COVID-19 symptoms [1,2]. COVID-19 and other lung disorders may also have symptoms that are similar in the early stages [3]. It's critical to tell the difference between COVID-19 and other lung disorders early on, since incorrect diagnosis might lead to more individuals contracting the coronavirus.

Deep learning algorithms have made it possible to classify images from beginning to finish without the need for manually feature engineering. Deep learning algorithms for similar

classification problems have been extensively used in the realm of COVID-19 detection [[4], [5], [6]]. Inception net was used to filter COVID-19 outbreaks with CXRs in Ref. [7]. [8] Researchers proposed a patch-based convolutional neural network (CNN) with a restricted number of trainable parameters to diagnose COVID-19. In Ref. [9], two strategies were proposed: a deep neural network based on picture fractal properties and a CNN architecture that directly utilized CXR pictures. Deep learning techniques for CXR photo categorization, according to the results, have the advantage of being able to collect pixel-level information that is not apparent to the human eye.

Despite the described application's performance, previous COVID-19 classification research reveals certain limits and problems. First, since the amount of accessible training data is restricted, several studies have revealed data imbalances across various classes. The imbalanced data is unlikely to train deep learning models efficiently, and the high accuracy under these conditions cannot ensure COVID-19 detection efficacy. Furthermore, a detailed analysis of photos from various data sources reveals that image quality, orientation, brightness, and other factors change across photographs in different groups. Instead, then concentrating on disease-related information in pictures, the algorithms may take these into consideration during categorization.

The purpose of this research is to create a multi-level multi-class COVID classifier for use in the CXR image screening process using deep learning approaches. The frameworks for end-to-end medical picture classification were created in response to the fact that receiving findings from a virus test is time consuming. They seek to accelerate the testing process, alleviate clinician burden associated with manual image processing, and give patients with quick findings, all of which contribute to coronavirus control and early diagnosis.

REVIEW OF LITERATURE

Deep learning's use in healthcare has increased dramatically during the previous decade. Deep learning models have been found to be effective at classifying pathological cancer pictures, diabetic retinopathy, CT scans of pneumonia, tuberculosis and microbiological slide images in a variety of studies. Pathologists, computer scientists, and radiologists have been collaborating in the area of pathology to use computer-aided diagnostics to identify illnesses including cancer, pneumonia, and tuberculosis [10–12].

To distinguish between pneumonia patients and healthy persons, radiologists use chest scans based on chest X-rays or CT scans. The difference is made because infected individuals acquire white fuzzy patches known as "Ground-glass opacity," which are absent in healthy persons. Due to the lack of a test for COVID-19, as well as the RT-PCR method's high cost, time consuming, low sensitivity, and laborious nature, scientists are turning to chest scans such as CT scans and X-rays as an alternative approach for diagnosing severe pneumonia caused by SAR-CoV-2 and bacterial pneumonia [13]. Additionally, this approach has its own set of challenges, including a lack of professionals (radiologists) who can interpret the data and the time-consuming nature of reviewing hundreds of CT scan and CXR images.

Many studies have utilized CXR and CT scans in combination with Deep learning to identify COVID-19 pneumonia as well as other types of pneumonia including non-COVID-19 viral pneumonia and bacterial pneumonia. In addition, multiple studies [14,15,17] have shown the

feasibility of using Transfer Learning models, which are deep networks pre-trained on the ImageNet database, to distinguish pneumonia from healthy CT scans.

Transfer Learning was used by Chowdhury et al. [16] to distinguish between COVID-19 and viral pneumonia in public database data. Both augmented and non-augmented models were trained using 423 COVID-19, 1458 viral pneumonia, and 1579 normal chest X-ray images. There was an increase in the model's accuracies, sensitivity, and specificity. COVID-19 and other types of pneumonia are classified by Mahmud et al. [17] using a multi-dilation CNN. Using dilation rate-based feature extraction, optimization, stacking algorithms, and gradient-based discriminative localization, the researchers trained COVXNet, a deep convolutional neural network, on a dataset containing 1493 cases of non-COVID-19 viral pneumonia, 305 cases of COVID-19 viral pneumonia, and 2780 cases of bacterial pneumonia. COVID-19 had a 97.4% accuracy rate when compared to normal, a 96.9% accuracy rate when compared to non-COVID-19 viral pneumonia, a 94.7% accuracy when compared to bacterial pneumonia, and a 90% accuracy when compared to multi-class.

To demonstrate the distinction between COVID-19 and community-acquired pneumonia (CAP), Li et al. [18] used 4352 CT images to construct a three-dimensional Deep Learning framework termed COVID-19 detection neural network (COVNet) (1292 of COVID-19, 1735 of CAP, and 1325 normal CT scans). The models had a sensitivity of 90% and a specificity of 96% for COVID-19 identification, and a sensitivity of 87% and a specificity of 92% for CAP detection. Apostolopoulos et al. [14] used the Transfer Learning technique to 1427 X-ray images (504 normal X-ray images, 700 bacterial pneumonia, and 224 COVID-19 X-ray images). The model has a sensitivity of 98.66%, a specificity of 96.46%, and an accuracy of 96.78%.

Abbas et al. [19] used X-ray images and a CNN model named Decompose, Transfer, and Compose (DeTraC) to classify COVID-19. The research analyzed data from a variety of hospitals throughout the globe. The model has a 95.12% accuracy rate, a 97.9% sensitivity rate, and a 91.71% specificity rate. Narin et al. [20] use two deeper models to identify COVID-19 and standard CXR pictures from the public domain. The models were 97 percent accurate for InceptionV3 and 87 percent accurate for Inception-ResNetV2) when fed 100 photos (50:50). An early transfer-learning algorithm was also used by Wang et al. [21] to classify 453 confirmed cases of COVID-19 with previously reported normal pneumonia. After external validation, the model's accuracy, sensitivity, and specificity were all 73.1%.

The Bayes-SqueezeNet [22] was developed to aid in the detection of COVID-19 using chest X-rays. The proposed network is made of two components: offline data augmentation and Bayesian optimization model training. The Bayes-SqueezeNet method was used to classify X-ray pictures into three categories: normal, viral pneumonia, and COVID-19. The network argues that it has handled the problem of divergent data acquired from public sources by using data augmentation.

CovidGAN [23] was developed as an auxiliary classifier generative adversarial network based on GAN [24] for the goal of detecting COVID-19. The CovidGan is constructed using the pretrained VGG-16 [25] and four custom layers, including a global average pooling layer, a 64-unit dense layer, and a 0.5-probability dropout layer. To enhance classification performance, the network used the GAN technique to produce synthetic chest X-ray pictures.

DarkCovidNet [1] is another CNN model for detecting COVID-19 using chest X-rays. It is modeled after the DarkNet [26]. DarkCovidNet has fewer (gradually increasing) filtering layers than DarkNet. This model was classified into two and three classes (COVID-19 and no-findings), respectively (COVID-19 no-findings, and pneumonia).

METHODOLOGY

This section details the proposed approach's methods and fundamental assumptions. The procedure of the recommended technique is shown schematically in Fig. 1. Alex Net is used to classify COVID-19, Pneumonia-Bacterial, Pneumonia-Viral, and Normal CXR pictures.

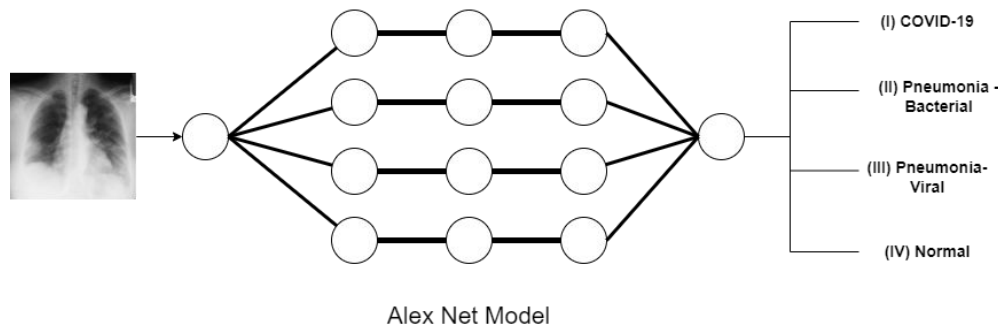


Figure 1

We used the COVID-19 Posterior-Anterior Chest Radiography Images (X-Rays) dataset from the Curated Dataset [27] (sample displayed in figure 2). This is a COVID-19 Chest X-ray image collection comprising of 15 publicly available datasets that has been curated. 1281 COVID-19 X-Rays, 3270 normal X-Rays, 1656 viral-pneumonia X-Rays, and 3001 bacterial-pneumonia X-Rays are included in this collection.

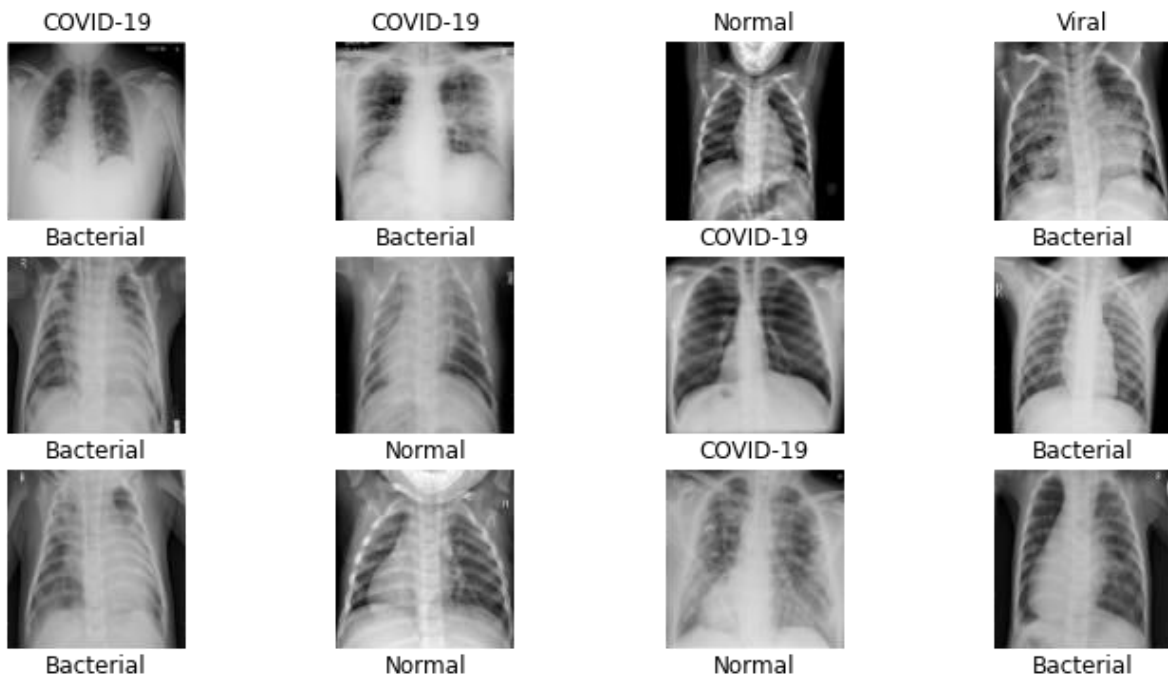


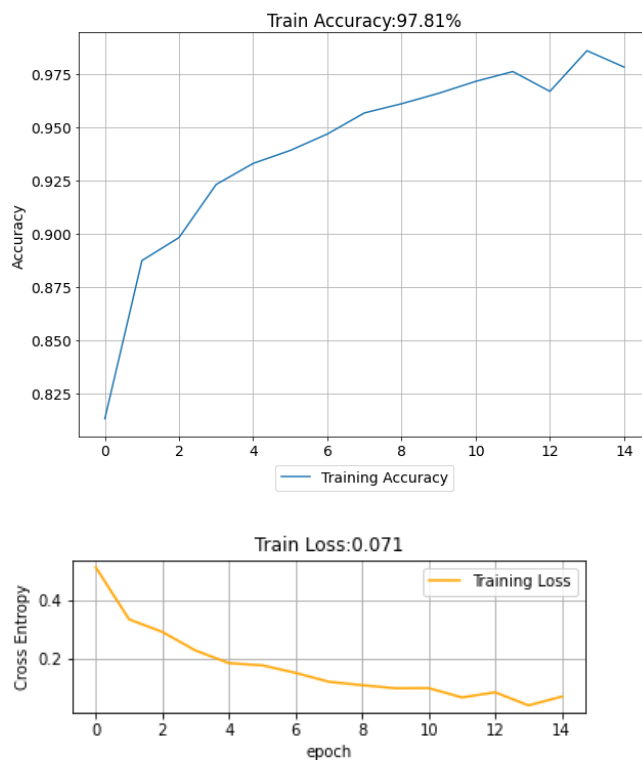
Figure 2

We balanced the dataset for the training model since bacterial-pneumonia and normal had a disproportionately large number of X-rays. We randomly selected 1281 X-rays from each class and split them into 80% training and 20% testing. As a result, the model was trained using 1025 X-rays from each class and tested using 256 X-rays. 4100 X-rays were used in training and 1024 in testing.

We used accuracy to assess the performance of trained models. Accuracy is defined as the ratio of correctly recognized pictures to the total number of images. The formula for accuracy is as follows:

$$Accuracy = \frac{Correct\ Predictions}{Total\ Prediction}$$

We first evaluated the performance of pre-trained InceptionResNetV2 over dataset. The training accuracy was 97.81% with a log loss value of 0.07. The learning rate was set to 0.001 and the number of epochs was set to 50, with the early stopping occurring after 14 epochs. When tested over testing data it gave accuracy of 58.49%. The training history of InceptionResNetV2 is depicted in Graph 1 and 2.



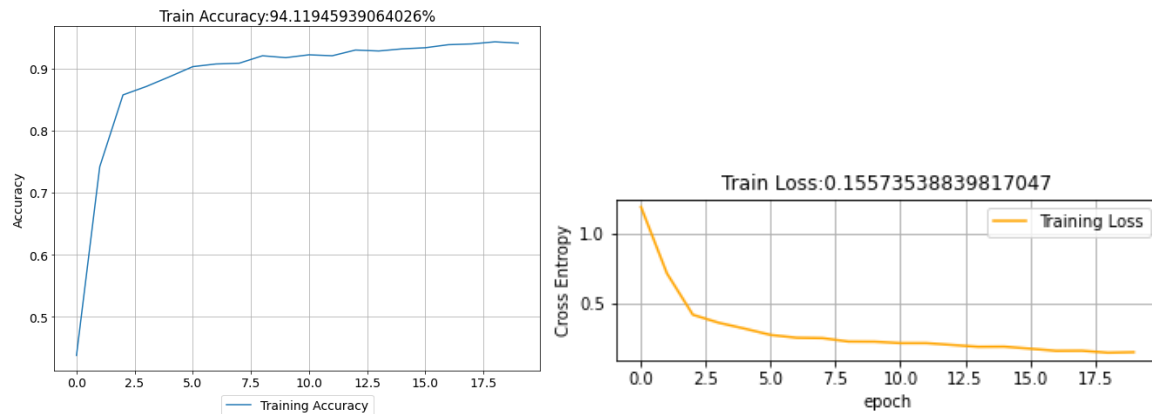
Graph

1

Graph 2

Then we deployed pre-trained ResNet50 model. It yielded a training accuracy of 94.12% and a loss value of 0.15. The learning rate was set to 0.001 and the number of epochs was set to 50,

with the early stopping occurring after 18 epochs. It had a 41.40% accuracy when tested on a testing dataset. The training history of ResNet50 is depicted in Graph 3 and 4.

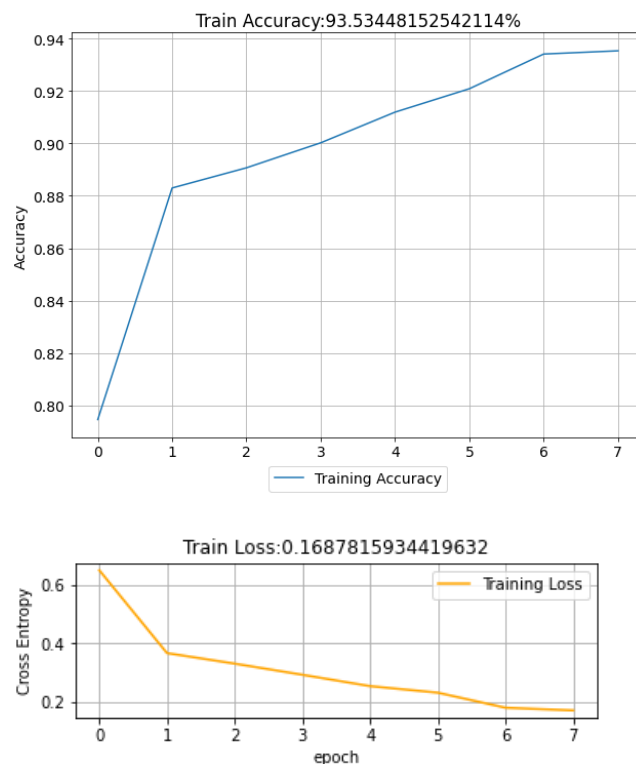


Graph

3

Graph 4

After that we deployed pre-trained InceptionV3 model. It gave training accuracy of 93.53% and loss value of 0.16. The learning rate was set to 0.001 and the number of epochs was set to 50, with the early stopping occurring after 7 epochs. When tested over testing dataset it gave accuracy of 61.52%. The training history of InceptionV3 is depicted in Graph 5 and 6.

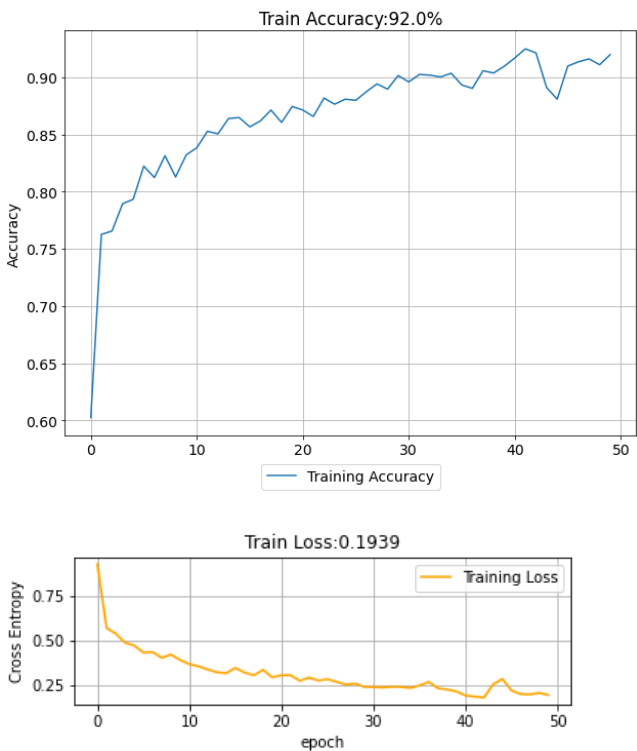


Graph

5

Graph 6

Finally, we employed Alex Net model over the dataset. It had a 92.00% training accuracy and a loss value of 0.19. It had a 71.97% accuracy when evaluated on a test dataset. In Graphs 7 and 8, Alex Net's training history is displayed.



Graph 8 7

The training and testing accuracy of all the models used has been shown in Figure 3:

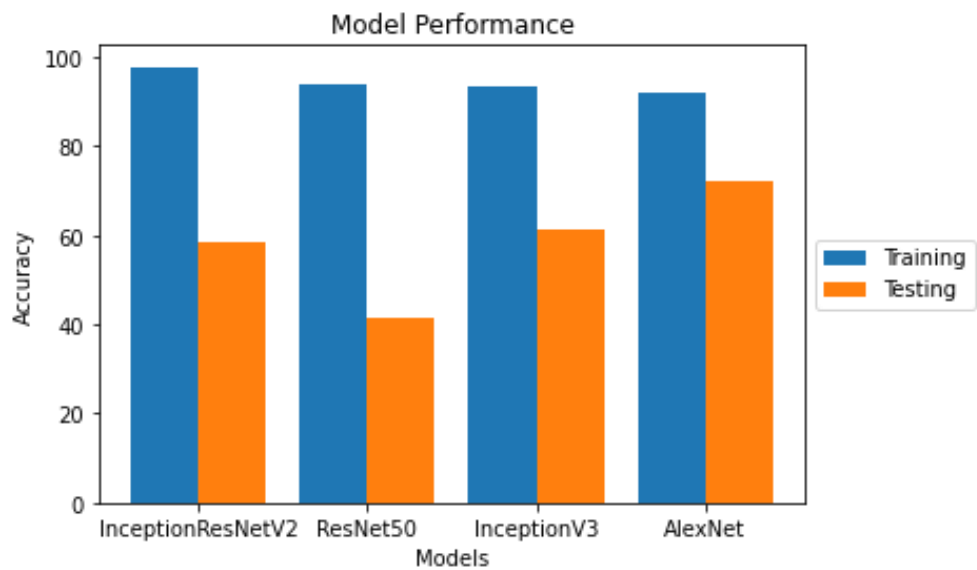


Figure 3

CONCLUSION

The purpose of this research is to demonstrate the usage of a deep neural network using a transfer learning strategy (referred to as a pretrained model) to distinguish COVID-19 pneumonia from non-COVID-19 viral pneumonia and bacterial pneumonia. The model was trained using four distinct categories of viral pneumonia (COVID-19, non-COVID-19 viral pneumonia, bacterial pneumonia, and normal), and the models were then tested for testing accuracy. As seen in Figure 3, the Alex Net model outperformed all other models used for transfer learning. While all models have a high degree of training accuracy, they fall short of the Alex Net model in terms of testing accuracy. This work reveals that computer-aided detection may be used instead of or in addition to the RT-PCR approach, which has been shown to be less sensitive, time consuming, and labor intensive.

FUTURE WORK

One of the research's drawbacks is that we used a dataset with a large number of CXR images with COVID-19 pneumonia with low image quality. This challenge makes it difficult to generalize our result. We intend to expand our dataset in the future and train images that match image quality standards using deeper neural networks. With a sufficient quantity of data, a cross validation technique may be used to assess the model's performance. Also, the testing performance is good but not exceptional; we will be striving to improve the model's performance by making more changes to the existing model and testing alternative models as well. Other research on this topic has primarily focused on 2 or 3 class classification, but has used imbalanced data and a small dataset; thus, this study establishes a benchmark for multi class multi-level classification using a balanced dataset that was kept as random as the model would encounter in a real-world scenario.

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CHAPTER 11

AN EXPLORATORY STUDY OF MACHINE LEARNING & ITS SCOPE IN INDIA

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ABSTRACT

Machine Learning (ML) and Artificial Intelligence (AI) both sound like fantasy terms from sci-fi movies. However, their concept is much simpler than what is being exaggerated. Machine learning means making the machine learn to use the algorithm in such a manner so that the proper user experience can be given. The biggest difference between a machine and a human brain is that they cannot do rational thinking, so in order to fill this gap, the technological moves were first driven towards artificial intelligence and now, towards machine learning for a closer approach. With the growth of the technological world, machine learning and its various algorithms have gripped numerous areas of automation. Its multifold, multi-dimensional approaches range from complex, high-end scientific applications to simple systems, from client-end to server-end, from e-commerce to medical world, and with all its yet to be explored facets. In the proposed paper, the concept of Machine Learning, its architecture, and an investigative study of its application areas, more particularly, in India has been presented, to identify further, the areas of its expansion and scope.

Keywords: Artificial Intelligence, Machine Learning, Algorithms, Automation, Architecture.

INTRODUCTION

Computer science deals with the science of computing. Major branches of comp. sci. are artificial intelligence, data science, cyber security, application development, information technology, and database. Machine Learning (ML) comes under the head of artificial intelligence. Artificial Intelligence (AI) is the process of feeding intelligence into a machine. The thing that differentiates us from machines is that the human brain can do rational thinking and decision-making. It is our own intelligence and intuition that sets us apart. Machine learning makes use of algorithms in such a manner that the machine learns to impersonate intelligent human behavior. Self-driving cars, face detection on mobiles, eye autofocus in cameras, beauty filters all of this is because of machine learning. In this paper, an exploratory study related to the implementation of Machine Learning in India has been done and its scope in the future has also been identified. Section II of the paper depicts the architecture of Machine learning and the various Machine Learning algorithms, Section III presents the study of the recent research work done by various researchers, related to the implementation of the Machine Learning concepts and techniques in India in diversified areas. Section IV presents the future scope of ML and Section V concludes the research work.

MACHINE LEARNING ARCHITECTURE AND ALGORITHMS

Machine learning is applied in almost every modern tech. This is required to achieve modernization and to match pace with the be a developed country. There are various architectures and algorithms in machine learning which are applied in a specialized manner. Some basic architectures are explained below.

(a) Supervised Learning

In supervised learning for supervision or efficient working a set of mathematically ordered data referred to as training data is prepared. In these training examples, both the inputs and desired outputs are there. These records of inputs and outputs are known as supervisory signals. This learning is associated with making and preparing mathematical models. Here the outputs are predictable.

(b) Unsupervised Learning

This type of learning does not make use of any pre-maintained database. No desired outputs are recorded. It believes in the concept of trends hence the desired outputs keep on changing due to the ever-changing technological environment. It is beneficial where the area of study is extremely wide. For example, self-driving cars, a car will go to different locations every day so it will automatically understand routes and obstacles with obtained data. The outputs are unpredictable here.

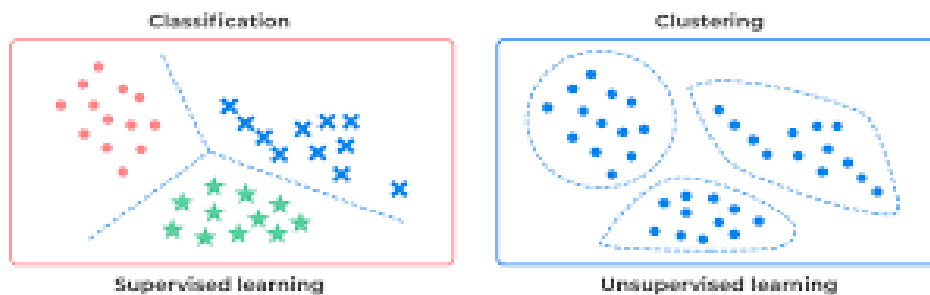


Fig 1.1: Supervised and Unsupervised Learning (*Image Source: analystprep.com*)

(c) Dimensionality reduction

Like the name suggests in this concept dimensions are reduced out of a dataset. Here by dimensions, we mean a number of random variables. It is simply associated with the extraction or elimination of various random variables. For example in the weather forecast.

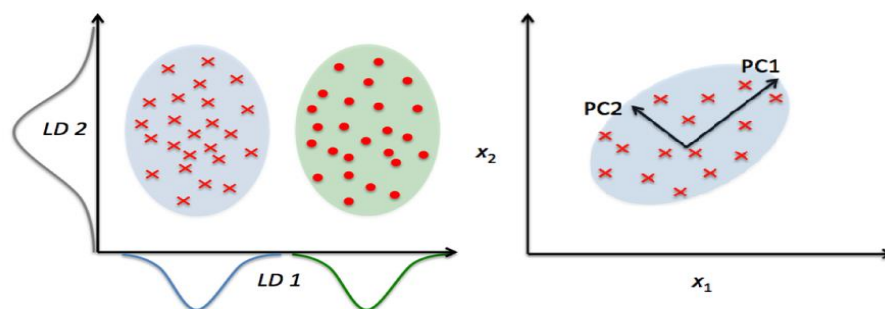


Fig 1.2: Dimensionality Reduction (*Image Source: towardsdatascience.com*)

(d) Reinforcement Learning

This training is used on gaming modules where the system decides the next move by relevancy. Especially in role-playing games, like solitaire or chess where you play with the computer. In this, the machine learns to work gradually with feedback as a child learns from its mistakes. For example, In a data set of an image scanner, on entry of three images of animals say, cats, dogs, horses, along with their labeled names. The feeding of the information along with the image and name would help in the learning of the machine. When a user enters an image of an animal different from the previously entered three images, the machine's answer will be different out of those three so in feedback when the user will give the correct answer the machine will learn it.

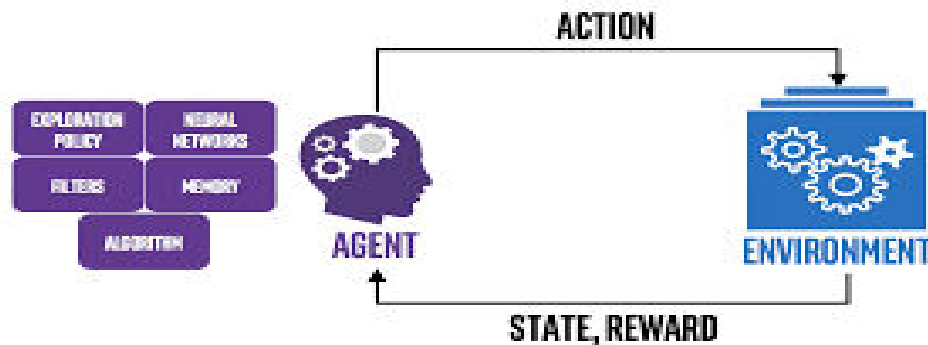


Fig 1.3: Reinforcement Learning (Image source: intellabs.github.io)

REVIEW OF LITERATURE: AREAS OF APPLICATION IN INDIA

Sharma B, et. al. in their study mentioned that Machine learning can be used to solve complex multidimensional equations to our day-to-day real-life problems. As India is highly involved in agricultural activities, machine learning was also applied in this sector. M.L. was used to predict wheat crop production using its different architectures like supervised learning, unsupervised learning, and reinforcement learning [1].

Rizwaan khan, et al in their paper stated that, when, In the year, 2020, world was suffering from the deadly disease of coronavirus, Machine learning was used to predict its waves and impact in different countries. M.L. is not always used in mechanical or robotics advancement, the business world is also its application area. Like as defect detection, sales analysis, etc. For predicting the covid wave in India the graph of patients was compared with previously affected countries like Italy and USA. The Prophet technique of machine learning was used for this purpose. In conclusion, this research was found effective as India was able to declare nationwide lockdown which was helpful for a span of time [2].

Shraddha, et al in their paper sated that With technological advancement one thing has excessively taken over us the increasing crime rate. Crimes like rape, robbery, burglary, murder are becoming common. Machine learning has been used to predict crime of a particular area through that location's past criminal history. Data mining approach and clustering techniques were used for this research. Other technical means were, Levenberg Marquardt, Bayesian neural networks and algorithms were scaled. Statistical tools of Anova were also used. The research concluded that 78% of crime can be reduced with the degree of accuracy being 78 [3].

Sudanshu Bhushan, et al in their paper did research on the economics sector. Artificial Intelligence and Machine Learning both were made use of. The global economy through artificial intelligence was studied by looking up various industries' literature and journals. As there are no limitations of artificial intelligence with more advancement better results can be graphed out [4].

Anoop Sharma, et al in their paper sated that India has a rich stock market and its prediction is a very complex task. So as to perform this job machine learning and artificial learning have been made use of. Series analysis and artificial neural networks were used for this research along with different machine learning algorithms. Comparative study was done in order to predict the stock price [5].

Moy Chatterjee, et al in their paper sated that Coronavirus was not only taking lives but also snatching livelihood from many, the economy of the developing country suffered horrifically. Machine learning with correspondence to artificial learning was used for forecasting covid-19 waves so that preventative measures can be taken. Linear regression was the direct approach in this research. Data were extracted from the Kaggle website, which was then deciphered by Weka and Orange. On the gained data from Kaggle, VAR, MLP, LR were applied. Mathematical equations were heavily used in this research. This research was found fruitful but for the future with deep learning more accurate results can be obtained [6].

Arvind Dhillon, et al in their paper sated that IoTPulse an enterprise health system proposed research based on machine learning to foresee addiction to alcohol. For this fog computing technique was used. This research was found more effective than existing one. It used Qos parameters which involved network bandwidth, latency, and response time [7].

Jew Das, Arvind Dhillon, et al in their paper projected the monsoon flow of the Wainganga basin. Around 40 GCM were created. The research was based on regression and statistics along with various machine learning algorithms. Downscaling was done using relevance vector machine and support vector machine. Kernel functions were used to test different machine learning algorithms. The results were graphic and proper, the sensitivity of high and medium monsoon flows was noted down [8].

Ajanta Goswami, et al did a comparative study on the Himalayas was done using machine learning algorithms to know landslide susceptibility. Machine learning was applied along with geographic information systems in order to precisely predict landslide susceptibility. Various neural networks and support vector machines were used. The results were satisfactory and got validated [9].

Syed Qamar, et al in their paper sated the, clinical data used by machine learning to detect Covid-19. The nature of the virus can also be forecasted by machine learning. Machine learning models were trained by data of X-rays and CT scans. Traditional as well as ensemble machine learning algorithms were used. Samples of 53 patients were used for training models. The results of the model gave 80% accuracy [10].

Anita Rai, et al in their paper sated that child marriage was a serious issue in India. Machine learning was applied to understand every aspect of child marriage. Literatures and journals

were cross-checked using machine learning algorithms. Surveys were the main source of information for this paper. Supervised architecture of machine learning was used to train models. In statistics, random sampling was done. For cross-validation, k-fold method was used. Various logistic regressions were used to deal with variables. Results showed the age group in which girls were married [11].

Pritee Sharma, et al did a study to understand changes in rainfall using machine learning. Various tests like the Mann-Kendal test and the Pettitt test were performed. Artificial Neural Network-Multilayer Perceptron was used to predict rainfall of 15 years. Rainfall trends were mapped using geo-statistical techniques. Results were not much precise so for minute level accuracy micro-level plan will be executed [12].

Pradeep Singh, et al focused that like machine learning, block-chain is also an advanced concept to feed intelligence in our machines. Block-chain makes one's system more secure and difficult to hack. With compiling machine learning and block-chain both machines can have an even higher level of intelligence and can give more precise output. Traditional machine learning algorithms, support vector machines, clustering, bagging, and deep learning algorithms of neural networks can be used to make this concept possible. However there some limitations and obstacles to this approach but as we know that in the future nothing is impossible [13].

Mamta Mittal, et al in their study used machine learning to monitor the air quality of Delhi during the covid pandemic. Machine learning techniques like Decision Trees, Linear Regression, and Random Forest were used. AQI tool was used to assess the air quality. Research showed that during the lockdown period pollutants like ozone and toluene showed an increase [14].

Rakesh Raja, et al in their paper sated that preterm (premature pregnancies) was becoming a serious issue in rural India. In order to predict such pregnancies machine learning was used. Machine learning techniques used for this study were decision tree, support vector machine, logistic regression namely. The accuracy rate of this study was 90.9% which is higher than any other research in this field [15].

Table 1.1: Recent Research Work related to the implementation of Machine Learning techniques

Sr . No	Year	Problem	Techniques and Algorithms Involved	Area of Implementation
1	2020	Prediction of crop prediction	Supervised, Unsupervised & Reinforcement learning	Agricultural Sector
2	2020	Prediction of Covid-19 outbreak	technique	Business & Hospitality sector

3	2020	Reduction of crime rate	Data mining, Bayesian neural networks, Levenberg Marquardt	Public Sector Security
4	2021	Impact of A.I. & M.L. in Indian sectors	Literature Reviewing & Statistics	Economics & Hospitality sector
5	2019	Prediction of Stock Market	Series Analysis and Artificial Neural Networks	Indian Stock Market
6	2020	Forecasting model for covid-19	Linear Regression, VAR, MLP, LR	Hospitality Sector
7	2018	Prediction of alcohol addiction	Fog computing & IoT	Hospitality Sector
8	2018	Evaluation of climate change	Kernel Functions, SVM, RVM	Geology Deptt.
9	2020	susceptibility	Neural Networks & SVM	Geology Deptt.
10	2020	Detection of covid-19	X-ray, CT scans, Traditional & ensemble M.L. Algorithms	Hospitality Sector
11	2020	Understanding of child marriage	Supervised learning, Random Sampling & logistic regressions	Law Enforcement
12	2020	Forecasting of rainfall changes	Artificial Neural Network, Mann-Kendal & Pettitt test	Geology Deptt.
13	2019	Compiling Block-chain with M.L.	SVM, Clustering, Bagging, Neural Networks	I.T.
14	2020	Monitoring air quality of Delhi	Decision Trees, Linear Regression, and Random Forest	Hospitality Sector
15	2021	Prediction for Preterm Birth	Decision tree, Support vector machine, Logistic regression	Hospitality Sector

FUTURE SCOPE

In the future machine learning has unlimited and immense scope. Artificial intelligence in machines is growing. Machine learning and artificial intelligence will take our science to the next level, nothing will be impossible. India is also making decent advancements in this sector. There are some areas that would not exist if it weren't for machine learning, in self-driving cars supervised learning will be heavily used, in quantum computers computing can't be done without deep learning and machine learning algorithms. If the privatized sector wants even more modernization they will be using robots and advanced machinery, so the concept that will make them advanced will be machine learning itself. Nowadays India's weather forecast is on point which was not the case in the prior years. It's a fact that India has a rich community of machine learning with over 5 Lakhs ardent. Hence it is considered the most acquired skill in India. Still, India has yet to achieve its full potential in artificial intelligence. Meanwhile, ISRO is also thriving which is a good sign. Still, there

is much more to achieve in comparison to other countries but, due to the continuous and consistent uplifting of Research and Development in India, India is on the right track and will surely do wonders.

CONCLUSION

Humans have always sought to build a comfortable life, the proof of this lies in the fact that there is a huge dependency on machines to get a different type of work, with a greater level of efficiency and ease. If machines are made less human interactive or where human assistance is negligible, machine learning will be utilized. From the review of the existing literature, it has been observed that there is no limitation in the application areas of ML, instead, its usage is expanding in all dimensions of life, from the medical world to the education world, from industrial units to the home arrangements. So, it is expected that there would be tremendous utilization of the ML everywhere in India as well as in the entire world.

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CHAPTER 12

DEEP LEARNING IN WIRELESS NETWORKING

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Ms. Keren Lois Daniel

ABSTRACT

At present, the wireless network seems to be complex but, in the future, it is going to be very thorny due to the rapid increase in the use of networking devices and miscommunication between too many radio waves. This problem will introduce the concept of edge computing which mainly focused on lower response time between two or more devices. In today's world, since the Internet-connected population is pervasive towards individuals' regime and entertainment, Deep Learning has led to the evolution of a new era that initially negotiates with the network dynamics like hotspots, building marble tracks, traffic tie-up, etc. DL is working efficiently in the field of IoT in which it acts as a helping hand in solving real-world problems. The complex uncooked statistics or rough patterns of raw data and their apposite sampling is adding aptness and senses to wireless networks using deep learning on a massive scale. But in Wireless Networking the use of DL are not as they can be, which might be a problem for the emerging silicon industry. In this paper, we mainly research the new initiative taken by the stemming technologies in the field of Wireless networking using Deep Learning. We highlight the top technologies which are working on signal encryptions, end-to-end connection establishments, channel exposure, the efficiency of the signal using DL, response latency, and mainly on enhanced security.

Keyword's: (Edge Computing, IoT, Response Latency, Channel Exposer, Traffic tie-up, DL)

INTRODUCTION

Algorithms can be studied and adapted to a converting environment in wireless networks. As a promising gadget studying device to address the correct sample recognition from complicated uncooked records, deep gaining knowledge of (DL) is becoming a powerful approach to add intelligence to wireless networks with large-scale topology and complex radio conditions. Deep studying uses many neural network layers to obtain a mind-like acute function extraction from high dimensional uncooked data. it could be used to find the community dynamics (including hotspots, interference distribution, congestion points, visitor's bottlenecks, spectrum availability, and so forth.) based on the evaluation of many community parameters (along with delay, loss price, link sign-to-noise ratio, and so on.). therefore, deep getting to know can analyse extraordinarily complicated wi-fi networks with many nodes and dynamic hyperlink first-class.

Deep Learning for Wireless Networking

Our present world is experiencing a digitization revolution because the tool associated with net customers will increase unexpectedly. Next Generation wireless Networks must provide ultrasound, low cycle communique, and intelligently manage net devices (IoT) in

actual-time eventualities. wi-fi network packages, along with real-time traffic information, sensor readings, sensor readings, or enjoyment tips of a vehicle without a motive force, or a piece of leisure advice, receive severe records volumes that need to be gathered and handled in real-time. these necessities for communications and key facts can handiest be carried out thru integration of wireless infrastructure and system gaining knowledge of methods of the ENGUSSEER tool.

The latest machine learning algorithms have received a vast interest in wireless networks and communication regions. The training algorithms and fashions of the version can include wireless communication evaluation and useful resource control and can be circulated in the main as communications and calculations to increase community programs are growing. but the usage of techniques for gaining knowledge of machines for heterogeneous wi-fi networks continues to be argued. studying machines and wireless network require extra effort to communicate.[7]

This unique trouble is to learn the latest achievements in the system getting to know ideas to get rid of practical duties from wi-fi networks. On this unique issue, researchers and scientists' gift various demanding situations related to new network modelling and structure, network packages, safety and privateness, useful resource control, load balancing, and designing future wireless networks using machine gaining knowledge.[1]

Deep Learning in Network Data Mining

The head concept in deep learning algorithms is automating the mining of representations from the information present. Deep learning algorithms use a big amount of unsupervised information to robotically extract complex illustrations. those algorithms are largely prompted with the aid of the sphere of artificial intelligence, which has the general aim of emulating the human mind's potential to look at, examine, research, and make selections, especially for extraordinarily complex issues. Paintings about these complicated demanding situations have been a key motivation behind DL algorithms which strive to emulate the hierarchical studying approach of the human brain that fashions primarily on shallow gaining knowledge of architectures such as selection timber, support vector machines, and case-based reasoning may fall short while trying to extract beneficial statistics from complex structures and relationships in the enter corpus. In comparison, gaining knowledge of architectures has the functionality to generalize in non-nearby and global methods, producing gaining knowledge of patterns and relationships beyond immediate acquaintances within the records. Deep gaining knowledge is a crucial step closer to artificial intelligence. It now not handiest offers complex representations of statistics which can be appropriate for AI obligations however additionally makes the machines unbiased of human expertise that is the last aim of AI. It extracts representations at once from unsupervised information without human interference [3].

A key concept underlying DL is, getting to know techniques is sent representations of the information, in which a big variety of possible configurations of the abstract functions of the entered information are viable, bearing in mind a compact illustration of each pattern and leading to a richer generalization. The variety of feasible configurations is exponentially

associated with the wide variety of extracted abstract capabilities. Noting that the observed statistics changed into generated thru interactions of several recognized/unknown factors, and as a result, when a statistics sample is obtained a few configurations of learned factors, extra information patterns can be described through new configurations of the learned factors and patterns. in comparison to gaining knowledge of based on neighbourhood generalizations, the wide variety of styles that may be received the use of an allotted representation scales speedy with the number of learned elements.

More knowledge of algorithms cause abstract representations because extra summary representations are frequently built primarily based on much fewer summary ones. An important advantage of greater summary representations is they may be invariant to the local changes within the entered records. studying such invariant functions is an ongoing foremost goal in sample recognition. beyond being invariant such representations can also disentangle the elements of variation in statistics. The actual statistics utilized in AI-related obligations mostly arise from complicated interactions of many resources. for example, a photo is composed of various sources of versions such as light, item shapes, and item substances. The abstract representations provided by way of deep studying algorithms can separate the exceptional assets of versions in records.

Deep mastering algorithms are main architectures of consecutive layers that applies a nonlinear transformation on each layer gives its input and then gives a representation on its output. The goal is to study a complicated and summary representation of the statistics in a hierarchical way employing passing the records through more than one transformation layer. The sensory statistics fed to the first layer. consequently, the output of each layer is provided as input to its subsequent layer.[4]

Deep Learning Methods for Packet Routing

With the speedy development of the internet, new internet programs in lots of regions require better speeds and greater network bandwidth. but a few present community technology face bottlenecks in assembly growing demand. in the meantime, gadgets gaining knowledge of era has shown brilliant potential in many areas in latest years. primarily based on this situation, it's far well worth exploring the software of machine gaining knowledge of in the field of laptop networks. community routing, which determines the path of a packet from a source to its vacation spot, performs a decisive position in selecting the course for packet transmission in a network. numerous regulations and operational objectives determine the choice criteria needed to select or broaden a routing technique. Minimizing charges, maximizing channel utilization, and supplying QoS are all not unusual criteria.

In well-known, traditional routing algorithms are designed based totally on a single criterion that isn't always appropriate for plenty of actual-world scenarios. as an example, with the Open Shortest route First (OSPF) protocol as shown in the parent, each packet is forwarded along the direction at 100Mbps, losing sources in conjunction with other channels and congesting the community. We desired to broaden a new set of rules that makes higher use of network resources. for decades, researchers had been dedicated to designing routing algorithms for

higher performance and growth. one of the guidelines is a mixture of the device getting to know generation and routing algorithms.

Mechanical schooling can be divided into three training, controlled machine learning, machine studying, mastering that does not exist, and studying the reinforcement in line with their famous priority. those classes are swiftly evolved in many regions, which include medical processing, pc imaginative and prescient, and herbal language processing of images. considered one of their benefits is the splendid potential to enhance the extension of the version because of the Data-driven mechanism. specifically, inside the improvement of education of graphical nerve networks and reinforcements, pc community scenarios can be without problems defined to a schedule, and there is much research on this route due to the fact the education of reinforcement may be without difficulty used to goal values. system schooling generation is to be had for each centralized routing algorithm and dispensed routing algorithm.

For every magnificence, several schooling device methods are used in lots of ways in two approaches of online and offline. we strive to make a surprisingly comprehensive inspection to put into effect new programs for training machines whilst routing from pc networks. All of this newsletter shows that it is an application that is combined with routing and managed to study technology or reinforcement education.[2]

Issues with Deep Learning in Wireless Networks

1. Too hardware dependence:
2. Deep neural networks require processors with parallel processing strength, by means of their structure.
3. For this reason, the realization of the device depends.
4. Unexplained functioning of the community:
5. This the most critical problem of ann.
6. When ANN gives a probing solution, it does now not supply a clue as to why and how.
7. This reduces consider inside the network.
8. Guarantee of right network structure:
9. There's no unique rule for figuring out the structure of artificial neural networks.
10. The best community structure is performed thru experience and trial and blunders.
11. The difficulty of displaying the problem to the community:
12. ANNs can work with numerical information.
13. Issues need to be translated into numerical values earlier than being delivered to ann.
14. The show mechanism to be determined will immediately have an impact on the overall performance of the community.
15. That is dependent on the user's capacity.
16. The duration of the community is unknown:
17. The community is reduced to a sure value of the error at the pattern approach that the education has been completed.
18. The value does now not give us most useful results.

Challenges with Deep Learning in Wireless Networks

1. Computing disaster of DL primarily based on the research from the MIT group in, figure 2 which compares the complexity of ML with Moore's regulation in one-of-a-kind eras. at some point in the Dennard growing technology, the computing functionality is progressed by way of increasing the clock pace, the power consumption of AI computation nearly follows Moore's law. It starts off evolving to grow faster than Moore's law throughout the multi-middle technology. today we have entered the technology of DL. due to the call for brute-force computing in AI, the power intake will increase away exceeding the boom fee of Moore's law therefore, it's far vital to consider energy consumption to make sure sustainable improvement. otherwise, our efforts within the area can be in vain.
2. Gradient Disappearance in DL The backward-propagation gradient iteration in DL is complete headache trouble for hardware acceleration structure, which affects wireless transmission latency and is of first-rate significance for the stop-to-stop communications.in the beyond, many neural community patching methods were evolved to deal with the troubles at the lower back-propagation of iterative gradient descent algorithms.[6]
3. The huge information required by using education deep neural networks is regularly collected by wi-fi communications. consequently, it turns into an essential way to teach neural networks correctly and quickly and consequently to decrease the requirement on huge information and wireless communications. even supposing the connection among the memory ability and the size of deep networks remains no longer clean with a huge memory ability is normally with a big number of parameters and calls for many statistics to train the version.

Machine Learning in Wireless Sensor Networks

Usually, sensor network designers represent system learning as a group of gear and algorithms that are used to create prediction fashions. however, gadget getting to know experts understand it as a wealthy field with very massive themes and patterns. information such subject matters will be beneficial to individuals who wish to use gadget mastering to WSNs [5]. applied to several WSNs applications, machine gaining knowledge of algorithms provide notable flexibility benefits. This segment provides some of the theoretical concepts and techniques of adopting devices getting to know in the context of WSNs. existing device learning algorithms may be classified by using the meant shape of the model. maximum gadget studying algorithms fall into the categories of supervised, unsupervised, and reinforcement learning. within the first class, system gaining knowledge of algorithms come with categorized training records sets. This set is used to build a gadget version that represents the studied relationships between inputs, outputs, and gadget parameters. not like supervised studying, unsupervised gaining knowledge of algorithms are not categorized (that is, they haven't any output vectors). The purpose of an unsupervised studying algorithm is to classify a set of samples into different companies (i.e., clusters) by way of analysing the similarity between entering samples. The 0.33 category is reinforcement gaining knowledge of algorithms wherein marketers' study by using interacting with their environment (i.e., online gaining knowledge

of). in the end, some gadget studying algorithms are certainly fallacious for this category because they share supervised and unsupervised traits. those hybrid algorithms (also referred to as semi-supervised learning) try to reduce the weaknesses while inheriting the strengths of those core categories [3].

CONCLUSION

We've got showed more than one protocol useful for optimizing network and communicate operations on a wireless network. Within the literature, we analysed several problems and troubles to use deep algorithms for mastering and machine studying that decorate network methods in diverse factors. Deep mastering set of rules and system mastering set of rules works very well on network, community optimization, sign control, channel challenge, network security, and Route. For network paintings. Although, it's miles tough to get Training facts, inclusive of various situations. The dynamic conduct of wi-fi networks makes it hard to generate schooling records sets. Similarly, the dynamic and unpredictability of multi-hop wi-fi networks make it difficult to find normal patterns in previously received data.

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CHAPTER 13

PERSONAL DATA PROTECTION BILL, 2019: KEY FEATURES AND ANALYSIS

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ABSTRACT

In order to ensure that India has a robust legal system governing and regulating data privacy, the Personal Data Protection Bill, 2019 (PDP) was introduced in the Lok Sabha on December 11, 2019. The Bill aims to create a Data Protection Authority to ensure security and privacy of a person's data available online. There were certain platforms which were targeted and focused on young adults aged 14-18 such as casual gaming, education, or even specific video platforms. Seeking parental consent in each of these cases would not only be difficult but also impractical. Similarly, audio and video streaming platforms may not be able to offer suggestions based on individual preferences. This paper will highlight the history of Data Protection Laws in India. An in-depth study on the chapters will be conducted to analysis the changes that can be revised to the Bill or addition to subsequent rules, to make complete data protection and privacy a reality in India.

Keywords: Data Protection Law, Data Protection Authority, Data Privacy, Personal Data Protection Bill

WHAT IS PDP

A performance development plan is a tool for improving employee performance. The PDP process helps managers and employees identify areas for improvement, set goals, measure progress, and outline a strategy to achieve those objectives. Performance development planning is usually held quarterly (coinciding with regular quarterly performance reviews), allowing employees and their managers to track progress and make adjustments as needed.

The PDPB proposes to protect "Personal Data" relating to the identity, characteristics trait, attribute of a natural person and "Sensitive Personal Data such as financial data, health data, official identifier, sex life, sexual orientation, biometric data, genetic data, transgender status, intersex status, caste or tribe, religious or political beliefs.

Pros & Cons?

The bill is a two-sided sword and has its own pros and cons.

PROS :

As projected by NITI Aayog, India is headed towards 730 million internet users by 2020. Globally, India ranks among top 10 spam sending countries and among top 5 countries to be affected by cybercrime. Hence, the bill works to check the instances of cyberattacks and the spread of fake news. The bill also entitles the individuals to a large number of rights which make the individuals well aware of the nature and the purpose of the data collected under Section 7. The Section 6 of the bill sets the extent to which data can be collected.

The future questions of the nation will revolve around the data. Therefore, Data Localization will help in the easy access of data for investigation purpose. This will make the corporations to have complete structural and technical changes.

CONS:

Even though the bill empowers the individual with certain rights, it has many loopholes. The government is entitled to access the personal data under wide reasons including national security, sovereignty, integrity etc. This may lead the state to intrude in the lives of the citizens defeating the purpose of the bill. The procedure of appointments of the members is also widely contested.

What is data Privacy?

Data privacy, sometimes also referred to as information privacy, is an area of data protection that concerns the proper handling of sensitive data including, notably, personal data but also other confidential data, such as certain financial data and intellectual property data, to meet regulatory requirements as well as protecting the confidentiality and immutability of the data. Roughly speaking, data protection spans three broad categories, namely, traditional data protection (such as backup and restore copies), data security, and data privacy as shown in the Figure below. Ensuring the privacy of sensitive and personal data can be considered an outcome of best practice in data protection and security with the overall goal of achieving the continual availability and immutability of critical business data.

What authority are responsible for data protection?

At present, there is no dedicated authority responsible for data protection in India. The IT Act contemplates the appointment of Adjudicating Officers for adjudicating whether provisions of the IT Act have been contravened. However, the implementation of this mechanism on the ground with regard to data protection has been fairly bleak. The PDP Bill envisages the constitution of the Data Protection Authority of India (“DPAI”) for enforcement of its provisions.

Here are the primary roles of an EU DPA:

- Handle data breach reports.
- Enforce data protection laws at the national level.

- Provide mediation.
- Offer advice to businesses on compliance.
- Interpret aspects of EU law, particularly when it comes to GDPR.
- Manage fines and other non-compliance penalties.
- Like most public agencies, the average business will never come into contact with DPA privacy protection agencies unless approaching them for advice or dealing with non-compliance penalties.

Why does India need a data protection law?

Amid the proliferation of computers and the Internet, consumers have been generating a lot of data, which has allowed companies to show them personalized advertisements based on their browsing patterns and other online behaviour. Companies began to store a lot of these datasets without taking the consent of the users, and did not take responsibility when the data leaked. To hold such companies accountable, the government in 2019 tabled the Personal Data Protection Bill for the first time.

Security Safeguards.

1. Having regard to the nature, scope and purpose of processing personal data undertaken, the risks associated with such processing, and the likelihood and severity of the harm that may result from such processing, the data fiduciary-and the data processor shall implement appropriate security safeguards including

(a) use of methods such as de-identification and encryption;

(b) steps necessary to protect the integrity of personal data; and

(c) steps necessary to prevent misuse, unauthorized access to, modification, disclosure or destruction of personal data.

2. Every data fiduciary and data processor shall undertake a review of its security safeguards periodically as may be specified and may take appropriate measures accordingly.

Data Protection Impact Assessment. (pdf)

(1) Where the data fiduciary intends to undertake any processing involving new technologies or largescale profiling or use of sensitive personal data such as genetic data or biometric data, or any other processing which carries a risk of significant harm to data principals, such processing shall not be commenced unless the data fiduciary has undertaken a data protection impact assessment in accordance with the provisions of this section.

(2) The Authority may, in addition, specify those circumstances, or classes of data fiduciaries, or processing operations where such data protection impact assessment shall be mandatory, and may also specify those instances where a data auditor under this Act shall be engaged by the data fiduciary to undertake a data protection impact assessment.

- (3) A data protection impact assessment shall contain, at a minimum
 - (a) detailed description of the proposed processing operation, the purpose of processing and the nature of personal data being processed.
 - (b) assessment of the potential harm that may be caused to the data principals whose personal data is proposed to be processed.
 - (c) measures for managing, minimizing, mitigating or removing such risk of harm.
- (4) Upon completion of the data protection impact assessment, the data protection officer shall review the assessment prepared and shall submit the same to the Authority in such manner as may be specified.
- (5) On receipt of the assessment, if the Authority has reason to believe that the processing is likely to cause harm to the data principals, the Authority may direct the data fiduciary to cease such processing or direct that such processing shall be subject to such conditions as may be issued by the Authority.

Comparison with the Personal Data Protection Bill, 2019 ("PDP Bill 2019")

Passwords are not considered to be sensitive personal data under the PDP Bill, 2019, though the Personal Data Protection Bill, 2018 had included passwords in the list of sensitive personal data. The GDPR too does not consider passwords to be sensitive personal data. Other than passwords, all other categories of sensitive personal data provided for in Rule 3 of the 2011 Rules is covered by the definition of sensitive personal data given in the PDP Bill 2019. Instead of 'medical records and history' and 'physical, physiological and mental health condition', the PDP Bill 2019 has 'health data'. The PDP Bill 2019 also has the following additional categories of sensitive personal data, which are not found in the 2011 Rules, namely, health data⁶; official identifier; sex life⁷; genetic data; transgender status; intersex status; caste or tribe; and religious or political belief or affiliation.

Steps to the PDP process

DATA PRINCIPAL RIGHTS

Right to confirmation and access.

The data principal shall have the right to obtain from the data fiduciary

- (a) confirmation whether the data fiduciary is processing or has processed personal data of the data principal.
 - (b) a brief summary of the personal data of the data principal being processed or that has been processed by the data fiduciary
 - (c) a brief summary of processing activities undertaken by the data fiduciary with respect to the personal data of the data principal, including any information provided in the notice under section 8 in relation to such processing activities.
- (2) The data fiduciary shall provide the information as required under this section to the data principal in a clear and concise manner that is easily comprehensible to a reasonable person

CONCLUSION

Pursuant to the PDPB being enacted into an Act, there are several compliances to be followed by organizations processing personal data in order to ensure protection of privacy of individuals relating to their Personal Data. Consent of the individual would be required for processing of personal data. Based on the type of personal data being processed, organizations will have to review and update data protection policies, codes to ensure these are consistent with the revised principles such as update their internal breach notification procedures, implement appropriate technical and organizational measures to prevent misuse of data, Data Protection Officer to be appointed by the Significant Data Fiduciary, and instituting grievance redressal mechanisms to address complaints by individuals.

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